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The Atlantic Monthly

JANUARY 1995

IN PRAISE OF SNOW

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comforting, and
fun, snow is also
bewilderingly complex
and of life-or-death
importance*

BY CULLEN MURPHY

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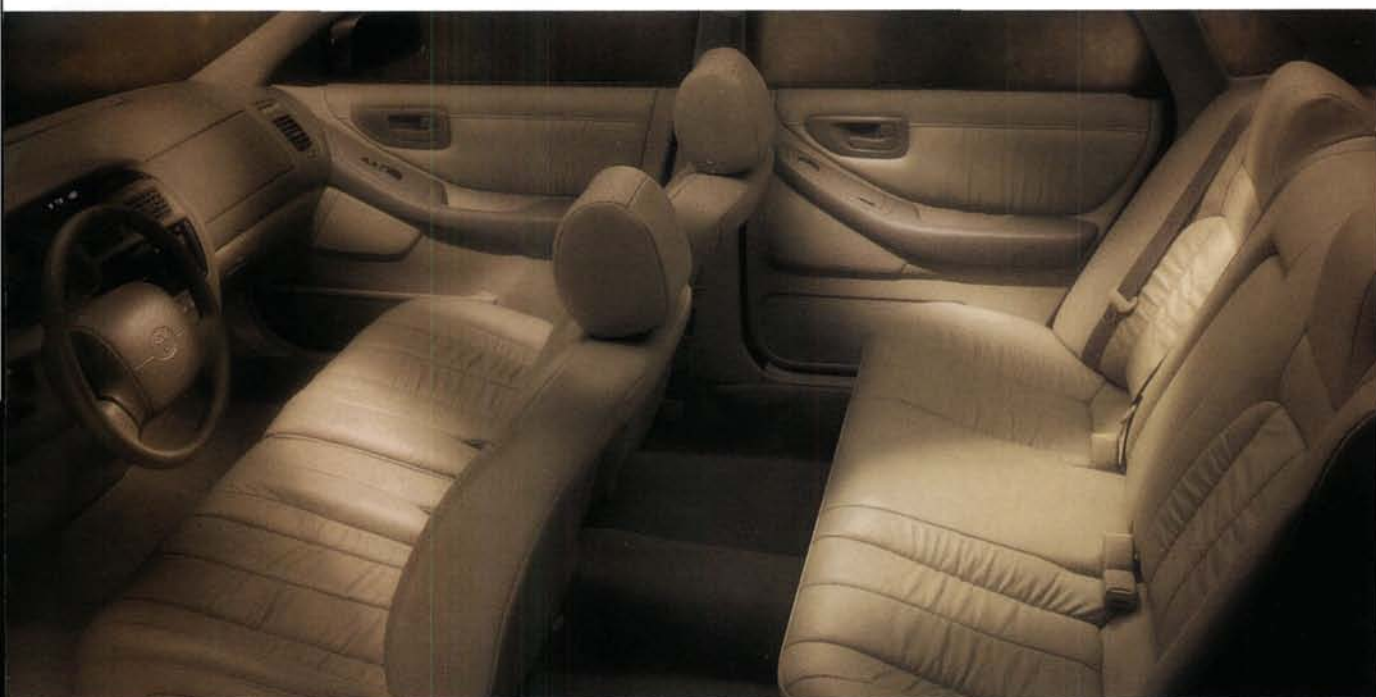
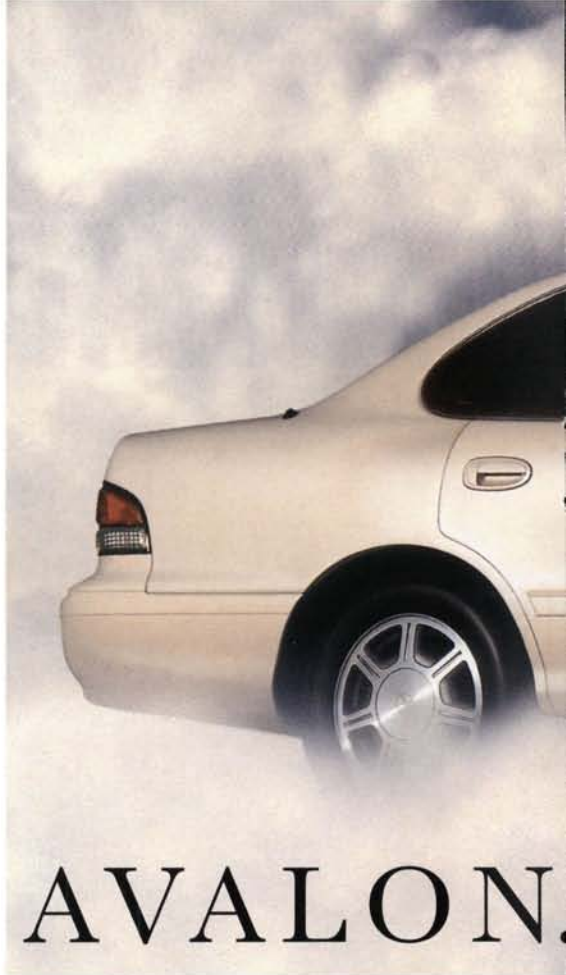
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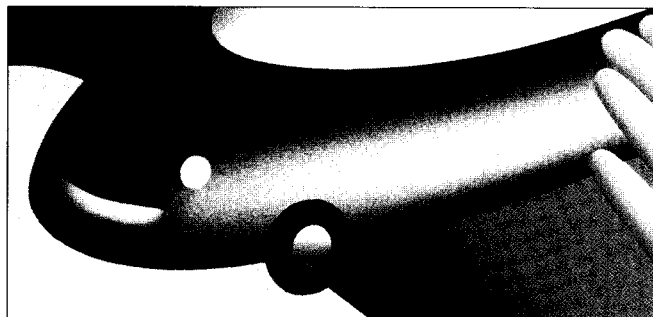


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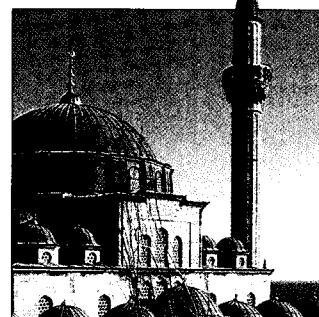
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FIVE or six times a year essays by Cullen Murphy, the author of this month's cover story, "In Praise of Snow," appear under the Notes & Comment rubric in this magazine. In all, some fifty of these highly polished, idiosyncratic ruminations on everything *except* what's in the headlines have been published since the first one, in 1984. Many of the essays have now been collected into a book, *Just Curious*, which is being published this month by Houghton Mifflin.

Murphy is impelled not by obsession, personal or political, or by scholarly obligation, alimony, or orthodontia—well, maybe orthodontia—but by an unquenchable mental appetite. To most of us, for example, snow is either an inconvenience or a pleasure. To Murphy snow is a *subject* (and also, as he tells us at the outset, a very great pleasure). This month's cover story investigates snow and the ways it is measured by sometimes intrepid snow scientists, whose culture Murphy nicely captures.

Murphy's prose is a windowpane through which his subjects—in *Just Curious* they range from Thomas Aquinas to a ventriloquists' convention to spontaneous human combustion—

always show clearly. Though his essays often impart quantities of information (slush will never seem the same after "In Praise of Snow"), they are frequently memorable for caramelized touches like these, from *Just Curious*:

—"It is perhaps going a little too far to say that the quickest way to make me change an opinion is to tell me that three hundred French intellectuals share it. . . ."

—"A few months ago a friend was elevated from the base munificence of her private law practice to the noble penury of the Connecticut bench."

—"In the scholastic economy, where sandwiches function as currency, we came to school with the gastronomical equivalent of zlotys."

With the anthropologist William Rathje, Murphy is a co-author of *Rubbish!: The Archaeology of Garbage*, which began as an *Atlantic* article. He also writes the comic strip *Prince Valiant*. In addition Murphy, as the managing editor of *The Atlantic*, oversees with exemplary aplomb much of the practical side of this magazine. He and his wife, Anna Marie, a former managing editor of *The Wilson Quarterly*, have three children. —THE EDITORS



MARTIN CORNELL

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Peter Davison ("I Hardly Dream of Anyone Who Is Still Alive") is the poetry editor of *The Atlantic Monthly*. He is the author of many books, including *The Fading Smile: Poets in Boston* (1994) and *The Poems of Peter Davison, 1957–1995*, which will be published this spring.

Mark Derr ("Beyond Efficiency") is a poet and journalist. He is the author of *The Frontiersman: The Real Life and the Many Legends of Davy Crockett* (1993). Derr is at work on a book about the relationship between human beings and dogs, which grew out of his March, 1990, *Atlantic* cover article, "The Politics of Dogs."

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Andrew Todhunter ("The Taming of the Saw") is an essayist and a screenwriter who lives in California.



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LETTERS

Sex Education

Barbara Dafoe Whitehead's article "The Failure of Sex Education" (October *Atlantic*) misleads readers about comprehensive sex education. Your cover and the accompanying illustrations further distort the truth.

The facts are that comprehensive sex-education programs have been proved to increase the proportion of young people who delay sexual involvement *and* to improve contraception use. Rigorous evaluations of these programs have definitively shown that sex education that is skill-based and includes information about contraception helps young people to postpone sexual involvement. More than a dozen research studies have demonstrated that sex-education programs do *not* cause young people to have sexual relationships. According to a 1993 World Health Organization meta-evaluation, no comprehensive sex-education program has caused teens to engage in intercourse earlier or more frequently. Additional evaluations show that programs that give students critical knowledge along with opportunities to develop interpersonal skills are effective at helping teens to maintain abstinence or to use contraception when they do have intercourse.

Whitehead assumes that the sole purpose of sex education is the prevention of teenage pregnancies and sexually transmitted diseases. The primary goal of sex education is the promotion of adult sexual health. Sex education seeks to assist children in achieving a positive view of sexuality, to provide them with information and skills for taking care of their reproductive health, and to help them acquire decision-making skills.

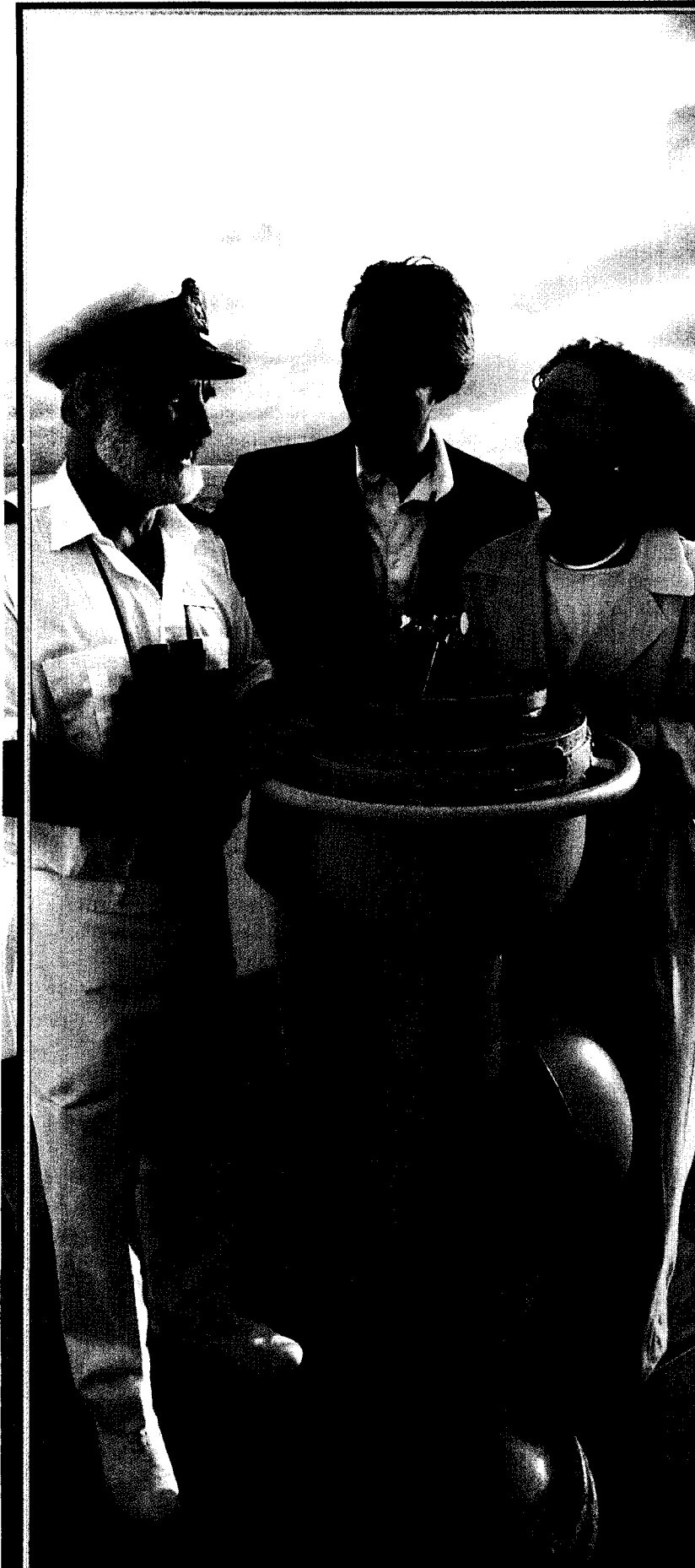
Whitehead insinuates that courses on sex education explicitly discuss sexual behavior without discussing values. Comprehensive sex education is based on a clear set of values. The National Guidelines Task Force, a group of representatives of mainstream national organiza-

tions, has come up with a list of values that underlie a comprehensive approach to sex education. These values include broadly held, widely accepted concepts such as "Every person has dignity and self-worth," "All children should be loved and cared for," and "All sexual decisions have effects or consequences." Perhaps most important, comprehensive sex education is based on the idea that "in a pluralistic society like the United States, people should respect and accept the diversity of values and beliefs about sexuality that exist in a community." Whitehead confuses presenting young people with an opportunity to develop their own attitudes, values, and insights with a fictionalized program that has no values.

Another of Whitehead's assertions is that schools have usurped parents as the sex educators of the nation's children. Parents *are* the most important sex educators of their children. In order to give young people the best possible chance to develop into sexually healthy adults, however, parents, schools, religious institutions, and communities must work together to educate and help develop interpersonal skills in young people. The Sex Information and Education Council of the U.S. (SIECUS) recommends that school programs develop active partnerships with the parents of the children in their classrooms.

Debra W. Haffner
SIECUS
New York, N.Y.

Barbara Dafoe Whitehead fails to ask a basic question: How widespread is this comprehensive sex education that she deplores at such length? The answer is that it is very rare, both in the nation and in New Jersey—SIECUS estimates that fewer than 10 percent of public school children receive comprehensive sex education, K-12. Whitehead's statement that "seventeen states have adopted mandates to teach comprehensive sex education" is simply wrong. The states have mandated sex education—resulting in a variety of



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programs, very few of which could be called comprehensive.

Whitehead also insinuates that comprehensive sex education is widespread in New Jersey. Had she read Professor William Firestone's 1993 report, *Is Playing It Safe Unsafe? Family Life Education in New Jersey*, more carefully, she would have understood that local districts develop the content, emphasis, and materials for their own programs. Instead of a single model, there are as many programs in New Jersey as there are districts: nearly 600. Some teach only about abstinence; others provide students with information about abstinence, contraceptives, and safer sex. Only a handful would pass a strict test for comprehensiveness.

Comprehensive sex education, therefore, cannot have failed; it has never been tried on a scale sufficient to succeed. If any sex education has failed, it is the too-little-too-late, "just say no" type of curriculum that is prevalent in our nation's schools.

Contrary to Whitehead's claims, current studies show that comprehensive sex education is effective in delaying the onset of sexual activity and reducing its extent and risks (Grunseit and Kippax, *Effects of Sex Education on Young People's Sexual Behavior*, World Health Organization, 1994). The Alan Guttmacher Institute's 1994 report *Sex and America's Teenagers* shows that American teens, though more sexually experienced than their predecessors, are also more responsible, and that the rate of pregnancy among them declined 19 percent from 1972 to 1990. In the past six years births to teens have declined in New Jersey, according to data from the New Jersey State Department of Health, Division of Maternal and Child Health. Further, New Jersey is one of only two states "to show a decrease [in births to unmarried teenage mothers] over the past six years" (*Kids County Data Book: State Profiles of Child Well-Being*, 1994).

Whitehead alleges that sex education is a failure because teen pregnancy rates have not dramatically dropped. This is a simplistic conclusion. The National Research Council of the National Academy of Sciences has concluded that early sexual activity and adolescent childbearing are complex socio-economic problems that require multiple solutions. These include reducing poverty and child sexual abuse, reforming welfare, and improving our inner-city schools. Sex education

plays a limited role in the overarching strategy needed to change these stubborn national problems.

Susan N. Wilson

*Network for Family Life Education
New Brunswick, N.J.*

Although Barbara Dafoe Whitehead makes a valid point, the teenagers she talks about compose a generation to whom the words "no" and "self-denial" have little or no meaning. Owing to exploitative promotional advertising and the clearly evident personal gratification of entertainment personalities, not to mention MTV's graphic contributions, plus peer pressure to conform and fit in, that generation's signature philosophy appears to be self-indulgence and fulfillment of every capricious desire, no matter how fleeting or fanciful. Any attempt to teach them chastity and delayed gratification of their sexual desires would be, in my estimation, like spitting in the face of an oncoming hurricane.

Pat Brown
Denver, Colo.

Your cover story "The Failure of Sex Education" is in itself a failure in that it all but ignores homosexuality. As a closeted gay teenager in the 1970s, I sat totally uninterested through high school sex-education classes that were entirely geared to heterosexuals. Teen pregnancies and heterosexual STDs are tragedies indeed—but why the continued silence about the tragedy of AIDS spread to gay youths who all too often feel worthless, and about the ignorance and hatred of homosexuals which are allowed to persist among too many of their heterosexual classmates? Whitehead's avoidance of these issues echoes the avoidance within many schools' curricula. Their failure to address these issues directly, and their heterosexual world view (as in a concept like "premarital"), result in an irrelevance to lesbian and gay youth that would be laughable were it not so life-threatening.

Eric Stults
Washington, D.C.

Barbara Dafoe Whitehead effectively dismisses family education as a means of promoting more-responsible sexual behavior among teens. As evidence of this failure she cites the fact that New Jersey, a state with a comprehensive family-life education program in its schools, has ex-

perienced an increase of 20 percent in births to unmarried teens in the past eleven years. With illegitimate births similarly increasing across the United States, Whitehead targets family-life education as an ineffective strategy.

Interestingly, while the rate of illegitimate births to teens has been soaring in the United States, Canada has experienced a decline in teen pregnancy, from 40,000 births in 1971 to 23,000 in 1990. At the same time, the Canadian abortion rate among women under twenty-five has also declined, from 48.8 percent of all pregnancies in 1981 to 37.9 percent in 1989. Our only explanation for this turnaround is more-effective family-life education in our schools, homes, and places of worship.

Robert Couchman

*Canada Committee for the International
Year of the Family
Ottawa, Ont.*

As a stay-at-home father of two little girls, I can't help wondering what is the biggest threat to my children's future and well-being. Hunger? Privation? Drive-by shootings? Or the Network for Family Life Education, the organization that has somehow duped school boards into adopting the comprehensive sex-education program?

Robert I. Craig

Somerville, N.J.

"Safe sex" and condom-distribution programs in schools are based on the misguided assumption that teen sex and pregnancies result from "ignorance." But a study by Dr. Luella Klein, of the American College of Obstetricians and Gynecologists, found that teen sex and pregnancies are less the result of ignorance than of loneliness, lack of self-esteem, peer and societal pressures, and lack of good character. For the most part, teenage girls become pregnant because they want someone to love—and someone to love them in return.

It is the responsibility of parents and physicians—not the schools—to provide children with medical information and medication. Consequently, when schools supply children with contraceptives, they transcend their legitimate function; undermine parental rights, responsibility, and authority; and address the symptoms rather than the root cause of the problem, which is our popular sexual at-

titudes and practices. For too many, sex—instead of being the communion of life and love within the sacrament of marriage—is a tool of masturbatory and voyeuristic gratification.

Instead of amoral and graphically explicit sex information and condom-distribution programs in schools, our families, churches, schools, social organizations, and business communities must re-emphasize the teaching, learning, and practice of moral values like courtesy, kindness, honesty, decency, moral courage, justice, fair play, self-respect, respect for others, and the Golden Rule. When young people develop nobility of mind, spirit, and character, they will understand how to conduct themselves not only in the sexual realm but in all other important areas of life as well.

Haven Bradford Cow

Eudora, Ark.

Barbara Dafoe Whitehead replies:

Debra Haffner's pieties about values do not survive a reading of the SIECUS literature. For example, as the author of a publication called *Winning the Battle*, Haffner herself urges communities to reject sex-education programs that teach right from wrong, present abstinence as a positive behavior, or ask students to write only about wholesome topics. And she seems to be unaware of the conflict between SIECUS's imperial mission to promote adult sexual health through the public schools and the schools' historical mission to teach reading, writing, arithmetic, and delayed gratification. Important as healthy sexual functioning may be, it is not the main business of the public schools.

Susan Wilson disputes my statement that seventeen states mandate comprehensive sex education, a figure published by SIECUS, in order to argue that comprehensive sex education cannot be judged a failure because it has not been adopted by enough school districts. But dissemination need not be widespread for programs to be evaluated accurately so long as the evaluation is done carefully.

Wilson also mangles her statistics. The national teenage pregnancy rate has not declined. According to the 1994 report from the Alan Guttmacher Institute, "the [pregnancy rate] among all teenage women aged 15–19 increased 23% between 1972 and 1990." Births to unwed teen-

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agers in New Jersey haven't declined either. The statistic Wilson cites is not an accurate measure of the absolute number of births to unwed teens aged fifteen to nineteen. According to the New Jersey Department of Health, the number of births to unwed teenagers in that age group increased from 1980 to 1990, even as the total population of unwed teenagers in the state was falling.

Both Susan Wilson and Debra Haffner point to a World Health Organization review of the research literature to support their case. However, few of the three dozen sex-education programs under review fit the New Jersey model. For example, none of the programs is designed for children younger than eleven, and only two target children under twelve. For many of the other programs aimed at younger teens, the study supports my finding: programs that focus on delaying sexual initiation are successful in doing so. Haffner also uses the study to refute a contention I do not make: namely, that sex education causes teenagers to engage in sex. Unhappily, neither Wilson nor Haffner addresses my central contention that Learning About Family Life and similar early-grade sex-education programs are rooted in a sexual ideology rather than sound empirical knowledge.

Eric Stults may be reassured to know that sex-education programs today pay more attention to gay youth, and particularly to the homosexual transmission of STDs, than they did a decade ago, mainly as the result of a federally funded education effort on the causes and prevention of HIV/AIDS. Also important is that many schools are adopting strict measures to identify and punish harassment and violence against gay students, although there are still too many places where such acts go ignored and unpunished.

Robert Couchman raises a familiar question: Why can't Americans be more like Canadians in their approach to sex education? America is a religiously, ethnically, and racially diverse society whose tradition of local control of the public schools effectively rules out a nationally standardized sex curriculum. The United States also lacks national health insurance, and thus the schools take on some of the responsibilities of the clinic.

There is a strong consensus in these letters that our hypersexualized marketplace culture contributes to the precocious sex-

uality of today's teenagers. If that is true, then perhaps sex-education advocates could lead the campaign to persuade sex merchants to abstain from their exploitative practices.

Electronic Hash

In blasting our edited collection of Supreme Court oral arguments as "Electronic Hash" (October *Atlantic*), Edward Lazarus accuses us of a "tawdry effort to improve on history." His indictment of *May It Please the Court* . . . claims that we "fictionalized" the arguments and created "speeches that were never delivered and telling exchanges that never occurred." As a lawyer, Lazarus should know that due process requires both notice of charges and a chance to be heard. Months after our conviction in your pages, without any notice or hearing, we plead not guilty and submit our appeal to your readers.

Charged with political bias in our editing, we first note that Lazarus refers throughout his article only to Peter Irons as editor. The cover of the tape set and the book both state in large print, which Lazarus must have seen, "Edited by Peter Irons and Stephanie Guitton." Whether from sexism or from misplaced chivalry, Lazarus shows his bias against the female half of our editorial team. We will respond together to the attacks Lazarus made on Irons, who belongs to state and federal bars at every level, including the United States Supreme Court.

Since accuracy is the issue, we turn first to arguments in the flag-burning case decided in 1989 as *Texas v. Johnson*. Lazarus makes clear his dislike of William Kunstler, whom he dismisses as a "radical attorney" who made "an ass of himself" before the Supreme Court in defending his despised client. (Since Lazarus clerked during that term, we suspect that he attended the argument and was put off by Kunstler's flamboyant style, which clashes with the gray-flannel dullness of most lawyers at the podium. For the record, Peter Irons has heard Kunstler argue and is equally put off by his style.) Looking for bias toward Kunstler on our part, Lazarus asks was it "mere coincidence" that we "cut" from the tapes "the part where Rehnquist catches Kunstler fudging the holding in a key precedent?" We are not guilty of this charge; the exchange on this case,

West Virginia v. Barnette, is on page 158 of our book. Whether Kunstler fudged this case or simply differed with Rehnquist on its relevance, we leave to readers to decide. Oddly, Lazarus also faults us for omitting Kunstler's offhanded remarks about the preceding argument that day. We left it out because it was irrelevant. Lazarus would have left it in because, in his view, Kunstler "insults the sensibilities" of the justices. This is simply untrue, as anyone who reads the transcript can see.

Lazarus makes other errors. He calls "dangerously erroneous" a supposed claim—not on the tapes but in the book's commentary—that *Roe v. Wade* "struck a compromise" on the question of whether a fetus is a "person" under the Constitution. We said nothing of the kind. Readers can turn to page 341 of our book. The "compromise" clearly referred to has to do with the point at which a woman's privacy right to abortion yields to the state's interest in potential fetal life, which *Roe* placed after the second trimester of pregnancy.

Errors like this undermine Lazarus's attack, but we will respond nonetheless to Exhibit A of our alleged distortion of the record, the edited arguments in the Little Rock school-integration case, decided by the Supreme Court in 1958 as *Cooper v. Aaron*. Forced into the cramped space of a letters column, we cannot reply here in detail to Lazarus's thousand-word dissection of the *Cooper* arguments. Not surprisingly, these were by far the longest and most difficult arguments to edit. Readers who slogged through Lazarus's article learned—halfway through his convoluted account—that the Supreme Court heard argument on two separate days, August 28 and September 11. The procedural history of this case was complicated, to say the least. Lawyers on both sides were running back and forth among three federal courts, seeking a final ruling on efforts by the Little Rock school board to delay *any* school integration for more than two years.

Three lawyers argued the *Cooper* case for almost eight hours over two days. The official transcripts occupy more than 200 pages. In editing these arguments down to twenty minutes for high school and college classes, we picked segments from both days to highlight the conflict between the two sides. Lazarus was upset that Irons began his tape narration, "It's September 11, 1958," without stating that some following segments came from the

August 28 arguments. Perhaps we should have noted this on the tape, but this minor conflation did not distort the legal issues. The arguments on both days were basically the same, and the segments we selected all relate to the central question before the Court: would delaying integration for more than two years violate the rights of black children? Every segment from August 28 was matched with one from September 11, and we picked those that stood out in audio quality and force of argument. Those who listen to the tape, or read the transcript in our book, will not be deceived.

Cooper is the only argument in which segments from two days were woven together. In a few others we made minor changes in the sequence of statements, to aid listeners in following arguments that lacked coherent structure. As Lazarus knows, lawyers and justices often jump from one issue to another, and pick up a dropped question many minutes later. None of our few changes in sequence, we believe, altered the point of an argument.

In his one concession to the problems we faced, Lazarus admits the “enormous difficulty” of editing many hours of oral argument into bite-sized chunks for classroom use. But he charges us with imposing our own “biases and predispositions” on this daunting task. His objections—and the point of his article—seem more political than practical. Lazarus suggests that in dedicating our book to Justices William Brennan and Thurgood Marshall, we have “taken sides in the current debate over constitutional interpretation,” which he considers “a poor perspective for the editor[s] of educational material.” Accusing us of advocating “judicial aggrandizement” in protecting individual rights, Lazarus takes sides himself as an advocate of a passive judiciary. Fair enough. This debate has two sides and plenty of contesting advocates.

But Lazarus is not fair in taxing us with “astonishing carelessness” in asserting—not on the tapes but in our book—that federal courts “have the ultimate power of enforcement” of constitutional rights. He claims that courts have “no enforcement power” of their judgments. The Supreme Court, in fact, refuted Lazarus in the *Cooper* case, the classic example of judicial power to enforce the Constitution as “the Supreme law of the land,” backed with injunctive relief and contempt sanctions on recalcitrant offi-

cials. Judges at all levels have ample enforcement powers, even if marshals and police officers carry them out.

In what strikes us as sarcasm, Lazarus thanks us for “giving me a reason to review the actual oral arguments for myself.” We extend an offer to *Atlantic Monthly* readers: those who want to “check [our] work” against the record, as Lazarus claims he did, are invited to write us (at the University of California at San Diego, La Jolla, CA 92093-0521) for copies of the complete transcripts in any case. We guarantee that every word on the tapes was spoken in the Supreme Court chamber, that nothing was “fictionalized,” and that the two sides in each case were given equal time and fair treatment. We urge readers to listen to the tapes and decide for themselves if we “[pull] the wool” over their eyes, as Lazarus charges.

We note finally—and without sarcasm—that Lazarus provided no footnotes in his book on the Sioux Indian treaty cases, which includes edited segments from hundreds of documents. We hope he will also provide full copies and allow readers to check his work against the historical record. After all, turnabout is fair play.

Peter Irons
Stephanie Guitton
La Jolla, Calif.

Edward Lazarus replies:

Peter Irons and Stephanie Guitton admit to conflating and switching around lawyers’ arguments before the Supreme Court, but plead that listeners to their “edited” tapes “will not be deceived.” How not? The edited tapes sound as though they present the oral arguments as they really happened. And the transcripts mask the editors’ electronic revisions by failing to indicate deletions or other shuffling. Yes, every word “was spoken in the Supreme Court chamber”—just not the way Irons and Guitton present them.

Irons and Guitton charge me—incorrectly—with three specific inaccuracies.

First, regarding *Texas v. Johnson*: true, on page 158 Irons and Guitton include a part of an exchange between Kunstler and Rehnquist regarding *West Virginia v. Barnette*. Omitted from the middle, however, is the crucial portion, where Kunstler, stymied in his reliance on *Barnette* and seeking support from another case, *Street v. New York*, is forced to admit un-

der further questioning that *Street* also might not be on point. Here, typically, Irons and Guitton’s editing vastly improves on Kunstler’s actual argument.

Second, Irons and Guitton cite page 341 of their book as proof that they do not mistakenly claim that *Roe v. Wade* “struck a compromise” on the question whether a fetus is a “person” under the Constitution. On page 341 they write:

[The lawyers’] most fundamental disagreement related to whether an unborn fetus was a “person” under the Constitution and was protected against deprivation of life by the due process clause. They also debated whether the same clause protected the “liberty” of a woman to terminate her pregnancy. Justice Harry Blackmun’s majority decision struck a *compromise on these questions* [emphasis added].

Enough said.

Third, Irons and Guitton are simply wrong when they assert that *Cooper v. Aaron* exemplifies the Supreme Court’s power to enforce the Constitution. In *Cooper*, as in every case, the Court could do no more than *declare* legal rights while depending on the executive branch for enforcement. Why else did President Eisenhower have to send in federal troops? Irons and Guitton concede that judges need marshals and police officers to carry out their orders. What they evidently fail to comprehend is that this is the whole point.

Apologies to Ms. Guitton for not crediting her role in editing the oral arguments. As she was named “Associate Director” of the tapes project, and Irons “Executive Director,” I took her to be the junior member of the team.

CORRECTIONS

In Andrew G. Kadar’s reply to a letter in the November issue, the phrase “including randomized clinical trials” was inadvertently placed in the fourth rather than the fifth paragraph. The correct version of the second sentence of the fifth paragraph is “Most [medical research] studies, including randomized clinical trials, have subjects from both sexes.”

A technological glitch caused the name of the editor of *Jacob Lawrence: The Migration Series* (Brief Reviews, October *Atlantic*) to be misspelled. The correct spelling is Elizabeth Hutton Turner.

THE JANUARY ALMANAC

Health & Safety

January 1, legislation takes effect today prohibiting physicians from referring Medicare or Medicaid patients to services from which the physicians could profit. The ban broadens a 1989 law barring doctors from referring Medicare patients to clinical laboratories in which the doctors have a financial stake. It applies to all federally funded patients (privately insured patients remain fair game) and covers a wide range of health-care services: physical therapy, occupational therapy, diagnostic radiology (including MRI and CAT scans), radiation oncology, prosthetics, orthotics, outpatient prescription drugs, and hospital services. The new law was inspired in part by two recent studies suggesting that doctors are far more likely to make referrals when they stand to profit. Its passage last year prompted a flurry of activity, as many doctors scrambled to divest themselves of their interests in outside medical services they use routinely—in many cases the best and least expensive facilities in the area.



Skies

January 3–4, the Quadrantid meteor shower peaks tonight; the best time for viewing is after midnight. The Quadrantids, whose parent comet is unknown, are typically blue with long white or silver trails. 15, Venus and Jupiter rise together in the hour before dawn. They lie just above the red star Antares, the heart of the constellation Scorpius. 16, Full Moon, also known this month as the Wolf or Frost in the Teepee Moon. 27, the waning Moon glides by Venus and Antares in the early morning sky.



Food

This month, 24 years after Japan in theory opened its apple market to imported fruit, the first U.S. apples arrive there. Japan's long-standing ban on U.S. apples, ostensibly imposed out of fear of pests and viruses, has been a repeated sticking point in trade negotiations between the two countries; U.S. growers say it has cost them some \$150 million over the past five years. The deadlock was broken last year, after inspectors from Japan's Ministry of Agriculture visited and approved selected orchards and packing facilities in Washington state. The agreement comes at an opportune time for Washington growers, in view of last fall's record-breaking apple crop of 5.5 billion pounds.

Environment

January 1, controversial provisions of the Environmental Protection Agency's 1992 Worker Protection Standard, designed to protect farm workers from hazardous exposure to pesticides, take effect today. From now on agricultural employers must provide workers with safety training, personal safety equipment, and emergency medical facilities equipped to cope with chemical exposure, and must post signs at entrances to pesticide-treated areas. Pesticide companies, for their part, must label their products with complete information on safe usage. The measures represent nearly 20 years of effort by workers' unions and environmental groups to make



employers responsible for environmental health. They prompted protests from farmers and agribusiness companies about the costs of developing instructional programs and labels for non-English-speaking farm workers (who now make up nearly a third of America's agricultural labor force). It is just such costs, however, that the EPA hopes will lead to inexpensive and environmentally sound alternatives to chemical pesticides, such as the use, on smaller farms, of spiders and other predatory insects to control aphids.



Government

Pilots, bus drivers, truckers, railway workers, and mass-transit workers head into the new year on a sobering note, as Department of Transportation rules mandating alcohol testing of transportation-industry workers take effect January 1. The regulations—the final result of the Omnibus Transportation Employee Testing Act of 1991—supplement existing drug-testing regulations. They will eventually apply to nearly 8 million transportation workers in safety-sensitive jobs, starting this year with those in companies having 50 or more employees. The rules stipulate that workers must not drink within four hours of performing their jobs (for pilots, eight); they must also submit to pre-employment, post-accident, “reasonable suspicion,” and random alcohol breath tests, and may not have a blood-alcohol concentration of 0.04 percent or greater. The catalyst for these measures was an August 28, 1991, subway accident in New York City, in which five people were killed and 200 injured when an intoxicated operator derailed a train.

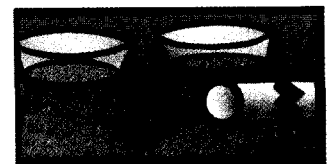


Expiring Patent

No. 4,068,810. Combination Motorcycle/Hang-glider. “A motorized hang-glider comprising: a flexible wing . . . having a central keel boom and a pair of . . . edge booms intersecting at their forward ends, forming an acute triangle . . . [and] a motorized vehicle . . . pivotally connected to said flexible wing, and positioned beneath. . . .”

50 Years Ago

Jacques Barzun, writing in the January, 1945, issue of *The Atlantic Monthly*: “How tiresome it is to hear nothing from our scientific departments but Sunday School homilies on the gameness of Galileo, the patience of Pasteur, and the carefulness of Madame Curie. And how uninteresting! Any man who accomplishes anything in any field is as patient as he has to be, and even little boys know that glass being breakable you have to be careful. What would be far more significant and novel—though true—would be to teach that Copernicus gambled on insufficient evidence; that Kepler was chiefly a horoscope-caster; that Faraday probably believed more wrong theories than any man alive, and turned them to good use in experiment; that Darwin, on his own admission, made awful blunders and admired the art of wriggling out of them. . . . The point is that science is made by man, in the light of interests, errors, and hopes, just like poetry, philosophy, and human history itself.”





“For



Millions

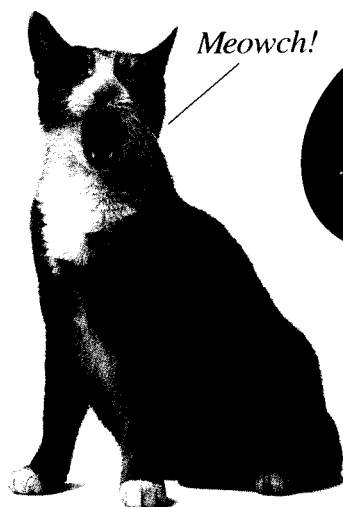


Of

Cats,



There's Something Worse Than Being



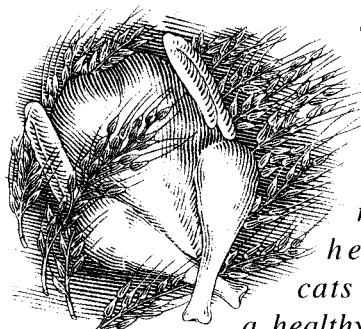
Meowch!

Chased By A Dog.”

—Robert Urich

A cat's urinary tract health is a big concern for millions of cat owners. But research shows that a diet of

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The Taming of the Saw

*Cutting to the heart of our ambivalence
about technology*

THE problem, clearly, was the cold. The old lodge on the Beaverkill in which we planned to spend the winter was built in the 1920s, before the rising cost of oil created the need for three-paned glass and modern insulation. By today's standards the once four-season lodge was now at best a summer home. There was a furnace of sorts, built for coal and later converted to burn oil at less than 40 percent efficiency. And the fireplace, a great stone maw that devoured all the fire's heat and a good deal more besides, was an even greater liability. When the wind blew across the chimney's mouth, it was like a giant pulling on a corncob pipe, and unless the flue was tightly shut, the pages of your book would flutter in the draw.

A wood stove seemed to be the answer.

We found a used one quickly enough, a friend's donation, its rusted interior still serving as the lodging for two mice and a decade's worth of shop debris. The mice crept gullibly into Havahart traps set with peanut butter (the rodents' bait of choice) and were bused to a lakeshore some miles to the east.

The wood was another matter. There was no shortage on the lot: its forty-odd acres were thick with deadfall and standing maple, beech, and other hardwood, seasoned upright and ready to be felled, split, and stacked. But the bucksaw—a museum piece of my father's childhood, still hanging in the toolroom and sharp enough despite its years—could hardly keep up with the demand of the cold months ahead, which was estimated to be six or eight cords. When our

friend the stove donor threw in the offer of a chain saw for the season, I readily accepted.

A chain-saw operator can fell and section a tree for splitting in a fraction of the time required with ax and manual saw. Hard work, of course, was part of the appeal of the place, but we had no hydraulic splitter. All work with wedge and maul would still be done by hand. By my reckoning, splitting six or eight cords over the coming months would constitute an adequate amount of outdoor labor. Sure, I said, I'll borrow your saw.

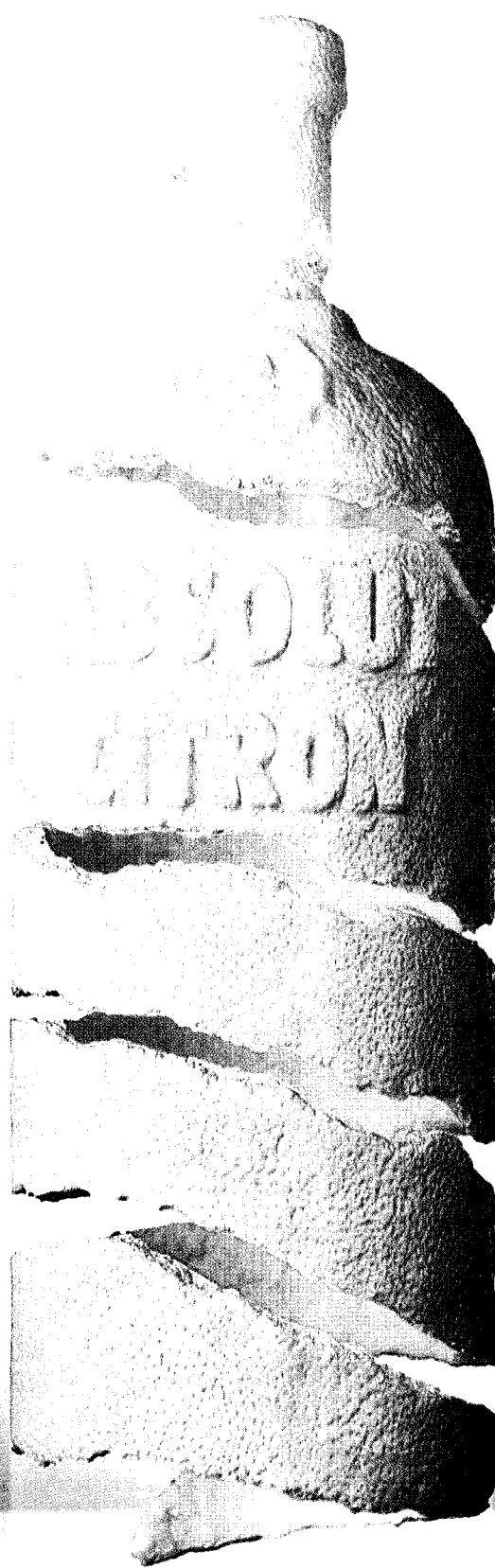
The chain saw holds a particular position in the average suburban-bred psyche. It wasn't an aspect of daily life in the town of my childhood, where firewood arrived in the back of a dump truck, paused briefly on the back porch, and eventually went into the fire.

Instead the tool was a film prop. Who can erase the image of the man-child in *The Texas Chainsaw Massacre*? The tool performs a grisly task in *Scarface*—*Naow zee leg, hunh?*—and is given a walk-on part in many other movies. Hollywood has branded the chain saw as an embodiment of psychosis and unbridled mayhem. And the machine provides its own sound effects—a roar almost as terrifying and aggressive as images of the blade in contact with flesh.

The chain saw's portrayals in legend do little to allay one's sense of its inherent malevolence.

by Andrew Todhunter





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The tale of the logger pinned beneath a fallen tree of impossible diameter, forced to cut one or both legs off with the tool and then drag himself, like Monty Python's Black Knight, legless through thirty miles of icy woods, is subject to infinite and often epic variation.

■ ■ ■

A new bar and chain were required for the beat-up saw, so I took it to the saw dealer, a neighbor who works out of his home. On his mantelpiece stood a row of gleaming figures, each holding high a golden laurel wreath. I read the engraved plaques on marble bases: First Place, County Chainsaw Competition, 1987. Second Place, Third Place, First Place, 1988, 1989, 1990. Chain-saw trophies from one end of his mantelpiece to the other.

"All won with this saw right here. The one I work with." He indicated a large German model sitting smugly in its open case.

He produced a stack of calendars, each month a different saw, a different champion. He opened one to reveal the present world champ in the custom class. The man held a modified saw the size of a Yugo, huge exhaust pipes sweeping back, the bar three-quarters through a horizontal log. Smoke and sawdust filled the atmosphere behind the champion. Sweat ran down his arms.

"Twenty-inch-diameter pine," the dealer said.

"How long did he take to make the cut?"

"Two seconds. At the outside."

He looked down at the pictured saw with unconcealed awe and shook his head.

"Nothing like it. I tell you, you should go to one of these saw competitions. It'll change your life."

With the new bar and chain came a thin booklet on chain-saw handling, a welcome document that I read carefully twice before setting hand to saw. It warned of the physics of the beast—the infamous kickback, caused by several possible circumstances but most notably the tip's catching on another surface. This can send the machine careering up and into a face or throat, its power diverted from the chain into the body of the saw. Other possibilities, less vivid but still formidable, were laid out simply, the precautions to be taken clear. To clarify the potential of kickback, the saw dealer had zealously dealt me another anecdote, this one with the legitimacy of a professional source.

An acquaintance of his stopped one evening to cut up a tree lying dead by the side of the road. He worked quickly in the dimming light, eager to get home, and didn't see the burl waiting for his blade. With a quick jerk the saw kicked back and fell to the ground from his hands. That was close, he said to himself, and reached down to continue the job. Then he felt the warmth from the severed carotid artery in his torn throat, and he lay down on the roadside to die. The next moment he reconsidered—there were children, a young wife—and with a balled-up rag pressed against the wound he tried to make it into town. He chanced to come up behind an off-duty ambulance and was

saved. By the time they got him stitched up, he had lost more than half his blood.

I finished the safety booklet and set out with heavy tread for the woodpile. Wearing shatterproof glasses, stout orange silencers, and rawhide gloves, I felt underprepared for an event that seemed to warrant a great heaume, hauberk, and greaves. I started the saw with a tug, ready for a kickback to beeline for my vitals. Spared evisceration in the starting, I poised for the first cut while the engine warmed. Several moments passed. Perhaps I should move the woodpile into the garage first, I mused, what with the coming of rain . . . Coward! Make the damn cut! The teeth nibbled delicately on the bark. Small chips flecked against my boots. The manual had advised that I operate at maximum rpm to reduce the possibility of kickback. With the trigger clenched and the engine howling at full throttle, the teeth took another taste. Bare wood gleamed; the dust blew golden on my pant cuffs. I allowed the saw to take long, steady gulps of the seasoned beech, snarling, vibrating deep into my upper arm, deceptively still, descending slowly and easily through the narrow width.

The section tumbled off into the leaves and the saw took a breath. I released the trigger. *Hum-a-ding-ding-ding-a-ding-ding*—it idled pleasantly like any healthy two-stroke motorcycle engine. I examined the chain, now still and wet with oil. The dust that had gathered where the chain slinks into the machine's innards was wet and gummy, like sedimenting grass on the bottom of a lawn mower.

Soon the pile was cut to length, the weapon more comfortable, if still unwelcome, in the hand. With the light step of a man who has cheated death, I stacked the hour's quick work and made it back inside as the first raindrops fell. The stove was fed for the night.

■ ■ ■

In the weeks to come I would tame the saw, learn its nature, acknowledge the enormous boost in productivity. I raced the stove and soon outstripped it. The woodpiles climbed faster than they could be devoured. Trees fell by the dozens, suddenly. Deadfall simply disappeared.

And now the fear of the machine is gone, leaving only the respect required for safe use. The chain saw is no longer a film prop but a simple tool that has saved hours of hard work.

And how I hate the thing: its roar, its stink, its jarring vibration, its very presence a transgression in the quiet of the woods. Perhaps most of all I dislike its efficiency. I now understand the mulish refusal of Tolstoy's serfs to give up their antiquated tools. It's more than a question of aesthetics, of an offended ear or nose. Nor is it simply stubbornness—that what is new must be worse. I suppose it's the intuitive awareness that what relieves us of our labor removes us from our lives. We grow more frail and dim-witted with each invention that outstrips us. It is this sense of robbery, of loss, that makes us cringe at technology's advance.

And yet the bucksaw hangs in the garage. We simply need the wood. ☼

JANUARY
1995

Arts & ENTERTAINMENT

PREVIEW

Jazz

Milestones for
Two Leading
Women

Pop

Mighty Horns
of Boston

Dance

The Paul Taylor
Company Back
in Form

Theater

August Wilson's
Epic of the Blues

Film

Cultural
Revolution
Uncensored

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Popular Music and Jazz

BY BOB BLUMENTHAL AND CHARLES M. YOUNG

MAKING JAZZ HER STORY

The pianist Geri Allen may be the most versatile jazz musician to emerge in the past decade. The Detroit native and Howard University graduate has displayed her command of freer forms, charted the borders of contemporary funk, and, more recently, freshened the post-bop vocabulary. Allen is most impressive, though, when working in a rhythm section of innovative elders. She recorded important albums a few years back with Charlie Haden and Paul Motian, and excels again on two new CDs with bass-and-drum teams from legendary Miles Davis groups.

Twenty One (Blue Note), with Ron Carter and Tony Williams, is indicative of Allen's refusal to find easy solutions. Many pianists would simply fall into Herbie Hancock mannerisms when confronted with Hancock's partners from his Davis days; but clichés are alien to Allen, and she responds with the probing melodic inventions and driving



Geri Allen: playing on the past

counter-rhythms that mark all of her work. As usual, her music is distinguished by an active left hand that flashes new voicings and imposes odd, infectious patterns, and a gift for composing brittle yet hummable tunes that mix well with her charged readings of standards like "A Beautiful Friendship" and "Tea for Two."

An Allen original from *Twenty One* serves as the title track for Betty Carter's *Feed the Fire* (Verve), a concert recording on which jazz's pre-eminent vocal risk-taker is supported by Allen, Dave Holland, and Jack DeJohnette. Carter scats effortlessly over the bumps of Allen's blues, while the singer's taste for elongated ballad tempos elicits detailed and personal piano support on "Love Notes" and the stunning duet "If I Should Lose You." —B.B.



THE MAGNIFICENT EIGHT

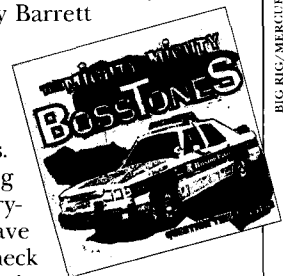
The Mighty Mighty Bosstones—of Boston, they often remind us—have labored mightily to unite horns with hardcore punk. Though influenced by English "two-tone" bands like the Specials and Madness, who played mostly ska, the Bosstones revert to choppy Jamaican rhythms only as interludes. On their fourth album, *Question the Answers* (Mercury), they charge straight ahead with exhilarating punk aggression and in the process create something close to new under the sun. Nobody has ever melded a roaring punk guitar (ably throttled by Nate Albert) with a tight horn section and inspired such an adrenaline rush in an audience. The whole band manages

to play completely out of control and completely in the pocket (most punks forget about the pocket)—but an extra dollop of credit must be allotted to Dennis Brockenborough's rollicking trombone. Forget all those military bands with fifty trombones going in and out in unison. This guy slides like Tonya Harding on acid. The trombone has a bright future in the mosh pit.

Lyrical, the Bosstones approach political correctness but never quite cross the line. They favor tolerance and beer, eschew greed and violence and misogyny, even when singing of romantic disappointment. They also favor lots of words. A Bosstones fan is expected to do some work memorizing, as opposed to just chanting along with a simple chorus. "Hell of a Hat" works exceptionally well, starting off as a Kinks-style satirical comment on fashion, and then questioning the wisdom of carrying an "accessory" in the form of a gun.

The vocalist Dicky Barrett has a raucous baritone perfectly suited to the monster live shows this band performs. They are touring pretty much everywhere, so you have no excuse not to check them out while they're still at their peak.

—C.M.Y.



Bob Blumenthal is a jazz critic for The Boston Globe and CD Review.

Charles M. Young is a writer based in New York.

CELEBRATING CIVILIZATION'S DECLINE



Legends of the fall: the Jesus Lizard, Quicksand, the B-52s, and Anthrax

In typical punk fashion, CBGB and OMFUG has managed to miss its twentieth anniversary by more than a year with *CBGB's 20th Anniversary Album* (Collision Arts/Giant). The birthplace of punk, it was particularly suited to middle-class white kids desperate to dispense with their suburban indoctrination. It was dark and dank and narrow like a cave, and it was the ground floor of a flophouse whose residents were too messed up to complain about the staggering noise and strange haircuts. The initials stand for "Country, Blue Grass, Blues, and Other Music for Uplifting Gourmandizers." All those musical forms have exploded in the past twenty years, but never at CB's, whose fate was to become a legendary New York rock scene. Many of the legends returned for the anniversary shows here documented: the B-52s, the Cramps, Anthrax, the Jesus Lizard, the Damned. The album truly feels like a visit to the club: loud, fast, harsh, energizing, the audience tempering its enthusiasm with irreverence. Also typical are several bands that don't quite fit, but it's all part of the proper ambiance. Don't miss the upcoming documentary, and when you're in New York, visit the club. It deserves landmark status. —C.M.Y.

Dance and Theater

BY AUSTIN BAER AND LAURA JACOBS

ALL THE RIGHT ANGLES



From *Big Bertha*

Quandary: which angle to choose in writing about the Paul Taylor Dance Company? That after a few so-so seasons the company suddenly looks coherent and robust? That in addition to the technical ascent of Patrick Corbin and Andrew Asnes

there is the arrival of two new beauts: Angela Vaillancourt, a dewy Amazon queen, and Edward Talton-Jackson, a lush-muscled African-American king? That the new work *Funny Papers*, for which six company members provided steps that Taylor shaped and stitched into a sleek comic turn, asks that old postmodern question "What is a dance?" without an ounce of angst? That the acid carnival sideshow *Big Bertha* is back in rep looking more evil than ever, and will also be performed by the Ohio Ballet in February, while the brilliant *Company B* premieres later this season at Miami City Ballet (February), Boston Ballet (March), and Pennsylvania Ballet (May)? Don't miss Taylor! The company performs in Purchase, New York, January 14; San Jose, California, February 10-12; and throughout the country in March. —L.J.

AFRICAN STRIDES THROUGH WESTERN EYES

In this famously difficult era of performing-arts presentation, let us honor for a moment the local entrepreneurs who book the international dance companies for whistle stops on city stages. My hometown, Chicago, owes much to the blue-haired ladies who kept the dance series vital during the seventies. We saw *everything*—and that included troupes like Le Ballet National du Senegal. To a dance imagination formed on the linear ideals of classical ballet, the dancers from Senegal were a jolt and an epiphany. The women, swathed in great cottons, move in measured heel-to-the-ground steps—distant mothers of post-



Le Ballet National du Senegal

modern dance. Moments of elation see them bolting straight up toward the sky, skirts hoisted and flapping. So dance is vertical space, too! Meanwhile, the men cover the ground in hunter's strides—there doesn't seem to be enough stage for them. It's been seven

long years since the company last toured America. This month the troupe from Senegal travels the East, appearing in New Brunswick, New Jersey (January 19); Brooklyn (January 21-22); Orono, Maine (January 24); New Haven (January 26); and Toronto (January 30-31); and continues westward in February and March. —L.J.

BLUES OF AUGUST

It seems that in the history of a nation there comes a time for epic. It seems that for the United States, that time is now, and the medium of choice is the theater. But whereas in Imperial Rome or Czarist Russia a single Virgil or Tolstoy could claim to be the mouthpiece for his culture, our Balkanized society is giving rise to a whole clamorous chorus of competing voices. Tony Kushner's *Angels in America* and Robert Schenkkan's *The Kentucky Cycle* are the most celebrated current examinations of the national identity, but do not forget August Wilson's ten-play, decade-by-decade survey of the African-American experience in the twentieth century, which, though still in progress, anticipated Kushner and Schenkkan by several seasons. The latest chapter opens January 13 at Chicago's Goodman Theatre (for tickets and information call 312-443-3800). The new *Seven Guitars*, set in the 1940s, focuses on the blues and people who play them. If Wilson is running true to the form of such earlier plays as *The Piano Lesson* and *Ma Rainey's Black Bottom* (the mother of them all), music should provide not only atmosphere but also key dramatic material and metaphors. Wilson's script is once again in the hands of his discoverer and longtime directorial collaborator, Lloyd Richards. —A.B.



Richards and Wilson

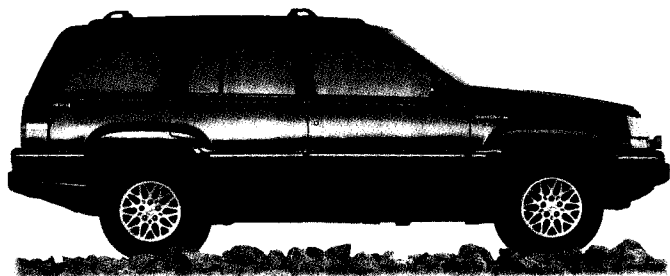
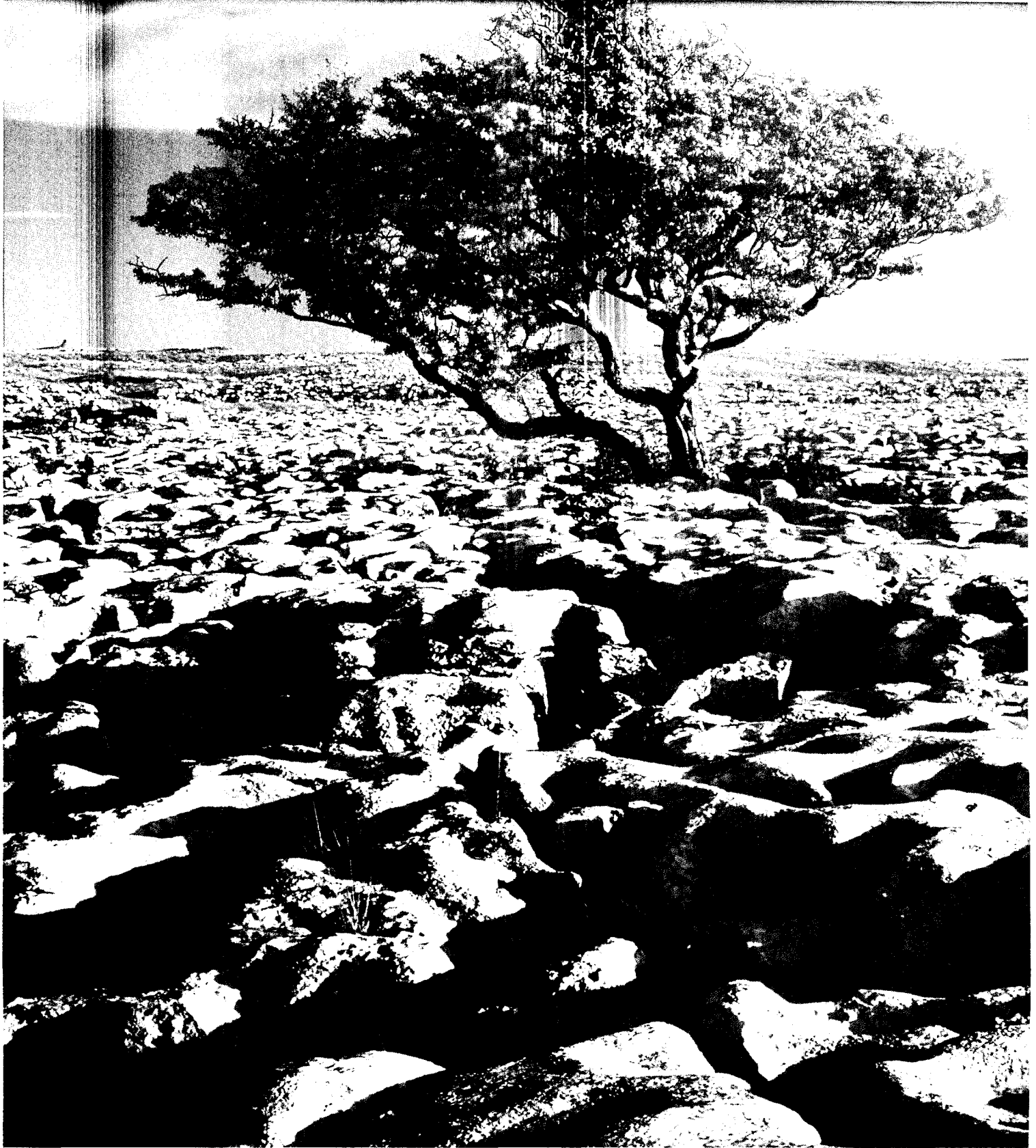
Austin Baer is a writer based in New York. Laura Jacobs is editor in chief of Stagebill.

MUCH ADO ABOUT BOGART

Jon Jory, the influential producing director of the influential Actors Theatre of Louisville, has called Anne Bogart "the most important acting and directing theorist since Stanislavsky and Brecht." Wow! And there's more. "Critics and professionals either adore Anne's work, or they think of her as a theatrical Antichrist." Well, everybody knows Stanislavsky's legacy (shorthand: the Method) and Brecht's (shorthand: alienation effect), but what about the Antichrist? A true-begotten child of our eclectic age, Bogart tosses into her cauldron a potpourri of American and international styles, an interest in choreogra-

phy, a fascination with psychology. She has yet to issue any major theoretical manifesto, show an important body of work to a wide audience, or influence any school of playwrights. Her signature is no signature at all. Still, Jory stands by his claim. This month, for the first time, his theater's annual "Classics in Context" festival is organized around a director in whose work Jory glimpses the future. Bogart casts her eye on Elmer Rice's *The Adding Machine* (1923), which deals with the replacement of people by technology; the writings of Anton Chekhov; and the life and ideas of Marshall McLuhan. For details call 502-584-1205. —A.B.



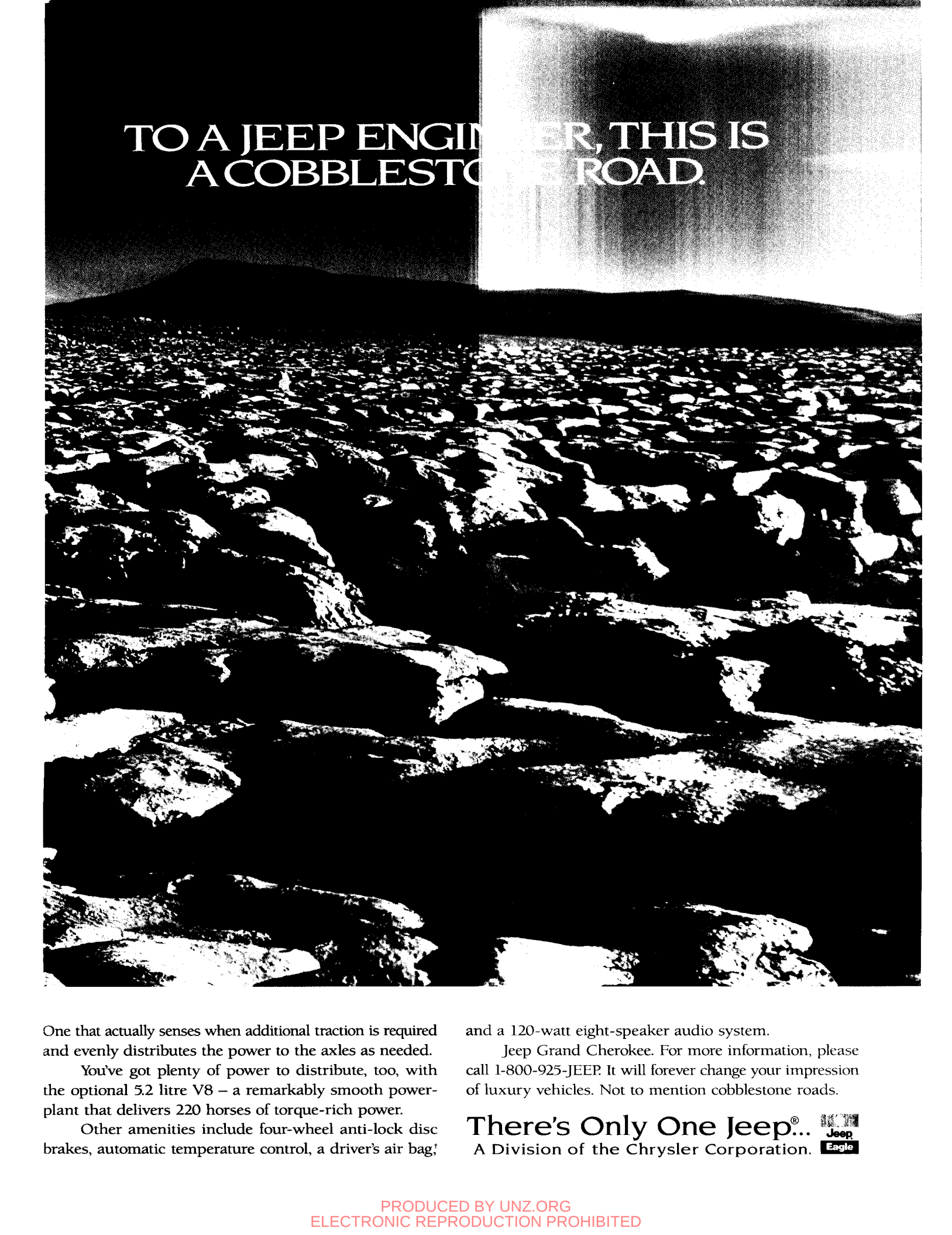


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Film

BY ELLA TAYLOR

JUST PALS

When gay meets straight in movies with an eye to crossover markets, the guilty pleasure of homoerotic attraction sags into the cuddly bond of friendship. So it is with two likable, modestly arty films about likable, intensely arty homosexuals trying to survive in unforgiving straight worlds. In English director Suri Krishnamma's folksy *A Man of No Importance*, Albert Finney (sprung, mercifully, from his endless drunk roles) plays Alfie Byrne, a virginal Dublin bus conductor who has the hots for his handsome young driver but drowns his lust in lofty love for Oscar Wilde. When he tries to stage a production of Wilde's *Salomé* with a starring cast of local yokels (in-



Modestly earnest Albert Finney

cluding Michael Gambon in a wonderful turn as a prudish butcher), all hell breaks loose and the entire community is forced—sort of—to face up to “the love that dare not speak its name.”

Strawberry and Chocolate, a new comedy from Tomas Gutierrez Alea (*Memories of Underdevelopment*), aims both lower (a sex-triangle romp) and higher (a political allegory about freedom and repression in contemporary Cuba). Jorge Perrugoria is enchanting as Diego, a gay aesthete and flamboyant free spirit who tries to pick up David (Vladimir Cruz), a tightly wound young Communist newly jilted by his girlfriend, at an ice-cream parlor. As mistrust fades into affection, Diego teaches David to lighten up and engineers the loss of David's innocence with his wacky neighbor Nancy. Everyone is very nice to everyone else, and everyone stays safely within his or her own sexual preference—which makes a charming buddy movie, but not much more.

Ella Taylor is a film critic for *Mirabella*.

A MOTHER TOUGH AND TENDER

If ever a movie was saved by actors, it's *Safe Passage*. Robert Allan Ackerman's dramedy about a family going about its mildly (too mildly) dysfunctional business while it waits for news of its black-sheep son, a Marine reported missing in a Sinai-desert bombing. The film achieves moments of grace and complexity, most of them provided by Susan Sarandon, who becomes more of a 1940s mega-star with each successive role. As Mag, the fiercely protective mother of seven boys and the estranged wife of an unrespon-

sive husband (Sam Shepard, suitably dazed) afflicted with deeply symbolic episodes of blindness, Sarandon hitches the spitfire toughness of Bette Davis to the warm sensuality of Ingrid Bergman, with a dollop of '30s screwball. Marcia Gay Harden, as the sensible lover of Mag's sensible son, makes a fine departure from her sex-bomb roles, and the

UNOFFICIAL HISTORY

Zhang Yimou (*Raise the Red Lantern*, *The Story of Qiu Ju*) is the quintessential people's filmmaker—just not the right kind for the Chinese authorities, who stifle his films in proportion to the laurels heaped upon them in the West. Those authorities are not about to break the habit with Zhang's new film, *To Live*, which won the Grand Jury Prize at the 1994 Cannes Film Festival. A celebration of one family's resilience from the 1940s through the terrors of the Cultural Revolution, *To Live* has an excited, epic energy that was missing in Zhang's beautiful but static earlier films, though it's still heavy on the symbolism (the father survives by adapting his puppet shows to successive régimes). Zhang tends at times to confuse simplicity with simple-mindedness—his proletarians lean toward

Gong Li in *To Live*

the bumpkinish and lack the rich complexity of the characters in Tian Zhuang-zhuang's thematically similar 1993 film, *The Blue Kite*. But *To Live* is enormously moving as an homage to the survival skills, solidarity, and extraordinary decency of a

Susan Sarandon in *Safe Passage*

boys mesh well, notwithstanding a pair of twins who look alarmingly like the Menendez brothers. *Safe Passage* works beautifully as a rare Hollywood celebration of possessive mothers (you won't hear the word “overprotective” once), but the film ends up feeling fractured and uncommitted. Ackerman wants the film to be *Fanny and Alexander*, but in his zeal to make a Christmas movie he keeps slipping into *The Brady Bunch*, splattering the action with mawkish, heart-warming tricks and the dialogue with ballsy lines like “God likes a go-getter.” God must be American.

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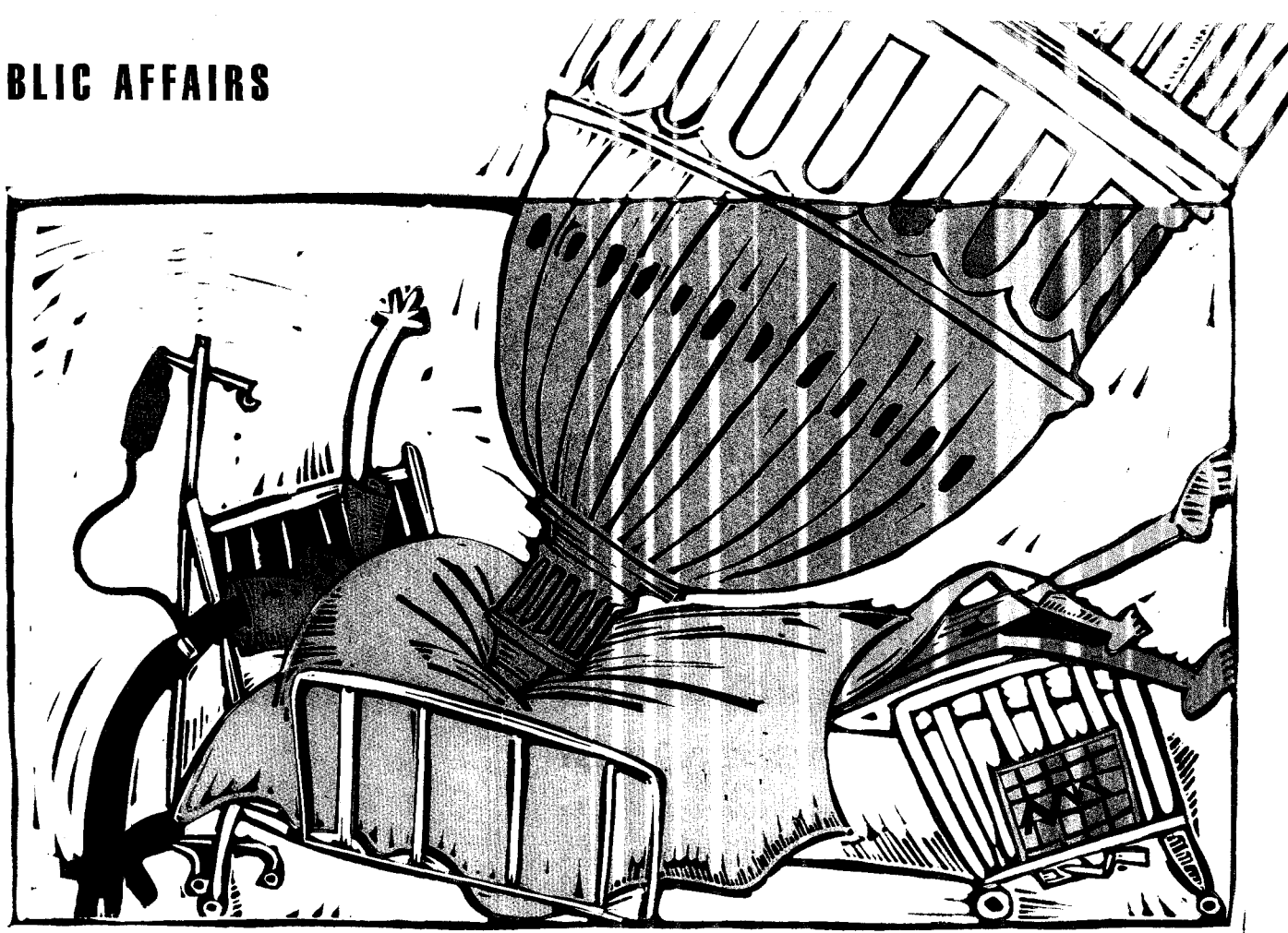
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A Triumph of Misinformation

Most of what everyone “knows” about the demise of health-care reform is probably wrong—and, more important, so are the vague impressions people have of what was really in the Clinton plan

BY the time the Clinton health-care-reform plan was abandoned, in September, everyone knew how terrible it was. It had been hatched in secret by an egghead team that knew a lot about policy details but had no grasp of political reality. The Administration had wasted time and missed deadline after deadline for presenting the plan to Congress, causing the plan to miss its best opportunity for passage—during the President’s brief honeymoon period, in

by James Fallows

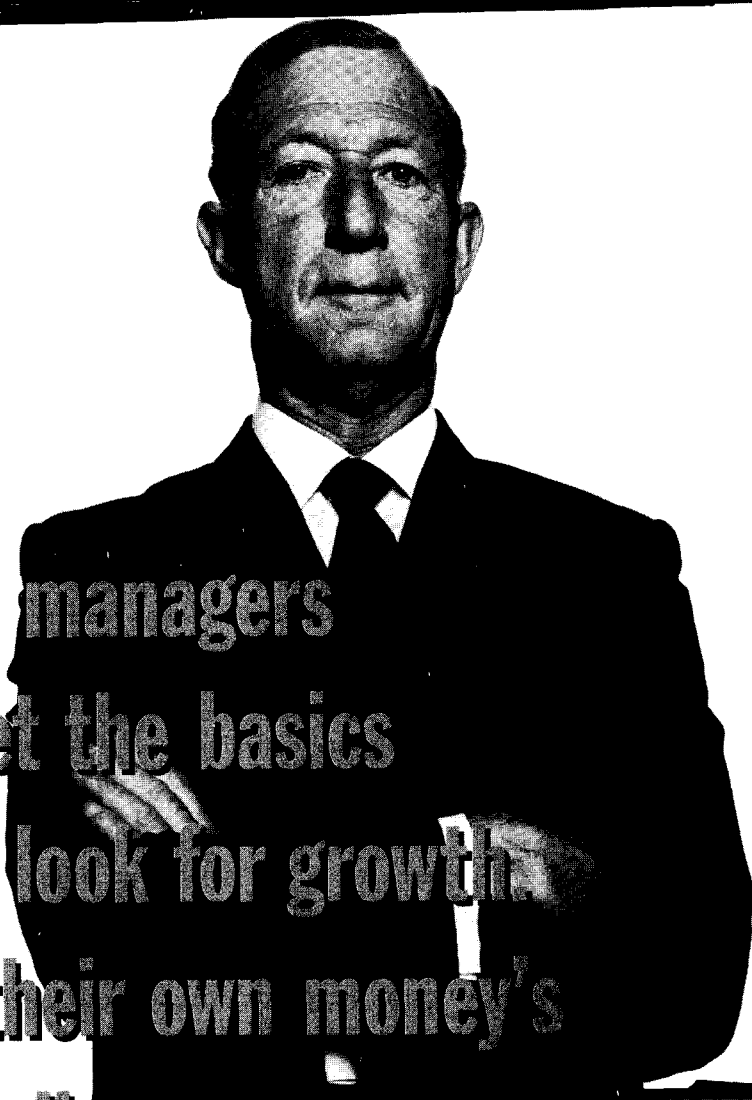
1993. The scheme was fatally overcomplicated. The proposed legislation, 1,342 pages long, was hard for congressmen to read and impossible for anyone except the plan’s creators, Hillary Rodham Clinton and Ira C. Magaziner, to understand.

The Clinton plan would have imposed sweeping changes on one seventh of the national economy, with consequences far greater than Congress could possibly consider before casting a rushed vote. It represented a regulation-

minded, top-down, centralized approach at a time when the world was moving toward decentralization and flexibility—and when the supposed health crisis was solving itself anyway. The more people learned about this plan, the less they liked it, and it finally died a natural and well-deserved death.

Or so goes the conventional wisdom, as relayed in countless newspaper and magazine postmortems of the health-care struggle. The critiques were usually accompanied by veiled jabs at Hillary Clinton—what will she do with her time now that health care’s gone?—and outright ridicule of Magaziner, who was portrayed as the smartest person with the dumbest plan since Robert McNamara and the Vietnam War.

But suppose that what everyone knows is wrong. This happens all the time in politics. Barely a year ago, for example, everyone in Washington knew that Congress was absolutely certain to pass a health-care program by now. The leaders of the Administration’s health-care-reform effort, Hillary Clinton and Magaziner, believe that everyone is wrong again now. I heard them elaborate this view in September and October, during a series of



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"No one understood this, but the average American patient would have had more choice under the Clinton plan than they now will."

long background conversations. "Background" means that I agreed to check with them on any material I wanted to quote directly. The gist of their views, however, was on the record. It is no surprise that they view the reform plan as something other than an overcomplicated bureaucratic nightmare. The surprise is how much more convincing their version of reality is than the prevailing one.

These conversations began at Magaziner's suggestion. He and I were friends in graduate school, more than twenty years ago, and he was obviously betting that I'd listen to him more sympathetically than other reporters would. I am biased, in that I like and respect Magaziner. But until these meetings I had had no contact with him during his time as health czar, and I have not always agreed with his ideas. (His worst achievement: helping bring a no-requirements curriculum to Brown University, when he was the student-body president in 1969.) In this case the facts seem to be on his side.

Let's consider each count in the conventional bill of indictment against the Clinton-Magaziner plan.

FIRST count: *The plan was hatched in secret.* During the 1992 presidential campaign Bill Clinton talked frequently about his interest in health-care reform and gave a signal about the reform approach he preferred. In a speech in September he recommended "competition within a budget." To the health-care cognoscenti this indicated an approach different from the main Republican and Democratic proposals of the time.

The most familiar Democratic approaches were "single-payer" and "play-or-pay." Single-payer, which was endorsed during the 1992 Democratic primaries by Senator Robert Kerrey, of

Nebraska, meant a Canadian-style or Medicare-style system. Private doctors and hospitals would provide care, but the government would take over all medical payments, financing them with a big new medical tax. All Americans would be covered. Play-or-pay, supported by many Democrats, required companies either to buy health insurance for their workers or to pay into a public fund, which would insure workers not covered by their companies. People who were not working would not be insured. An approach popular among Republicans relied on new tax breaks to encourage people to buy health insurance on their own. Some politicians from both parties endorsed a "managed competition" scheme, separate from all these.

Clinton's reference to "competition within a budget" fit a proposal laid out in the fall of 1992 by Paul Starr, a Princeton professor, in a short book called *The Logic of Health Care Reform*. This book came closer than any other document to anticipating the ultimate shape of the Clinton-Magaziner bill.

In Starr's plan, which was a variation on a managed-competition scheme, all Americans would be covered—even if they were out of work, even if they had "pre-existing conditions." The cost of coverage would be paid mainly by companies, which would contribute to the insurance premiums for each of their workers. The government would subsidize coverage for those who were unemployed or worked for small firms. Private insurance companies would offer coverage, as they do now, but the government would "manage" the way they competed for business. Each company would come up with a list of standard benefits, which it would have to offer at the same price to all customers. That is, the insurers could not turn down people who were already sick, or charge fifty-five-year-old applicants more than thirty-year-olds. Each year people could compare the offers and choose the plan they liked best—including a fee-for-service plan that let them go to their family doctor. From the customer's point of view, the system would work like the "open enrollment" policy at many corporations, in which employees can choose a new health plan each year. The government would set an overall limit on the amount of money that could be spent on medical care each year, while giving insurance companies and health plans latitude to spend the mon-

ey as they thought best. This limit was the "budget" in Clinton's reference to "competition within a budget."

With numerous changes of detail and emphasis, the plan that Starr explained in his book and that Clinton alluded to in his campaign became the plan the Clinton-Magaziner task force unveiled in 1993. The most important difference lay in what was meant by "within a budget": the bill that Clinton presented would have limited total spending not directly, by fiat, but indirectly, by limiting the amount that insurance premiums could rise each year. The process of working out these details and emphases kept Magaziner and some 500 task-force members busy round the clock during the Administration's first few months.

ACCORDING to today's conventional wisdom, these meetings doomed the reform effort before it really began, for it was here that Magaziner and his fellow nerds cooked up their unrealistic schemes. But did the process seem weird, secretive, and isolated at the time? Yes, but in only one limited and revealing way.

On matters of substance, the task force went out of its way to hear a variety of views. Most members of the task force were policy or budget officials borrowed from other parts of the government, but the group also included outside scholars and experts, plus several doctors and nurses. There were no representatives of organized outside interests—no delegate from the American Medical Association, no one from the Pharmaceutical Manufacturers of America—but the task force met frequently with outside groups and above all with senators, representatives, and their staffs. By early May, *Congressional Quarterly* reported, the task force had met with 572 separate organizations. "We had a couple of hundred meetings with the congressional leadership and individual members," Magaziner says now. "People were saying that it was the biggest outreach effort ever in laying the groundwork for a bill."

Indeed they were saying so. A *Congressional Quarterly* headline on May 22 read, "CLINTON TASK FORCE ALL EARS ON THE SUBJECT OF OVERHAUL." The article said,

Most members of Congress give the president high marks for laying the political groundwork necessary for his proposal to get the careful considera-

tion of both parties. . . . Clinton has been playing the health-care issue with an eye to keeping everyone at the table, at least at the outset.

In late September of 1993, when Hillary Clinton appeared before five congressional committees in three days to explain the rationale behind the bill, not a single legislator complained about "closed" or "secretive" deliberations: not Robert Dole, not Robert Packwood, not John Danforth—Republican senators who all later came out against the bill. Senator John Breaux, of Louisiana, a conservative Democrat who supported a competing reform plan, praised Hillary Clinton for the "truly remarkable" consultations the task force had carried out.

So when did the task force become "secretive"? Complaints inevitably arose when Magaziner and his assistants stopped soliciting outside advice and started announcing decisions. Those who disagreed felt that they hadn't been listened to. "Some people say they were excluded because in this case we didn't agree with them," Hillary Clinton told me. "But I think that a fair assessment is that we listened to everybody—and then made recommendations based on what we thought made the most sense."

The larger problem was with the one group that truly was excluded from the deliberations—the Washington press and, by extension, the public in whose interest it is supposed to act. During the brusque early weeks of the Clinton Administration, when George Stephanopoulos was walling reporters out of the White House press office and the Administration thought it could use talk shows to take its message directly to the public, over the heads of the daily press, Magaziner was told by the White House communications office that he and his associates should not talk to reporters about what ideas they were considering for the new bill. Instead they were supposed to refer all queries to the communications office. This didn't stop leaks, of course, but it gave Magaziner a

lasting reputation among reporters as a man who liked to operate in the dark. Hillary Clinton is known within the Administration for a combative attitude toward the press. But she now says that the news blackout on emerging details of the health bill was a major mistake.

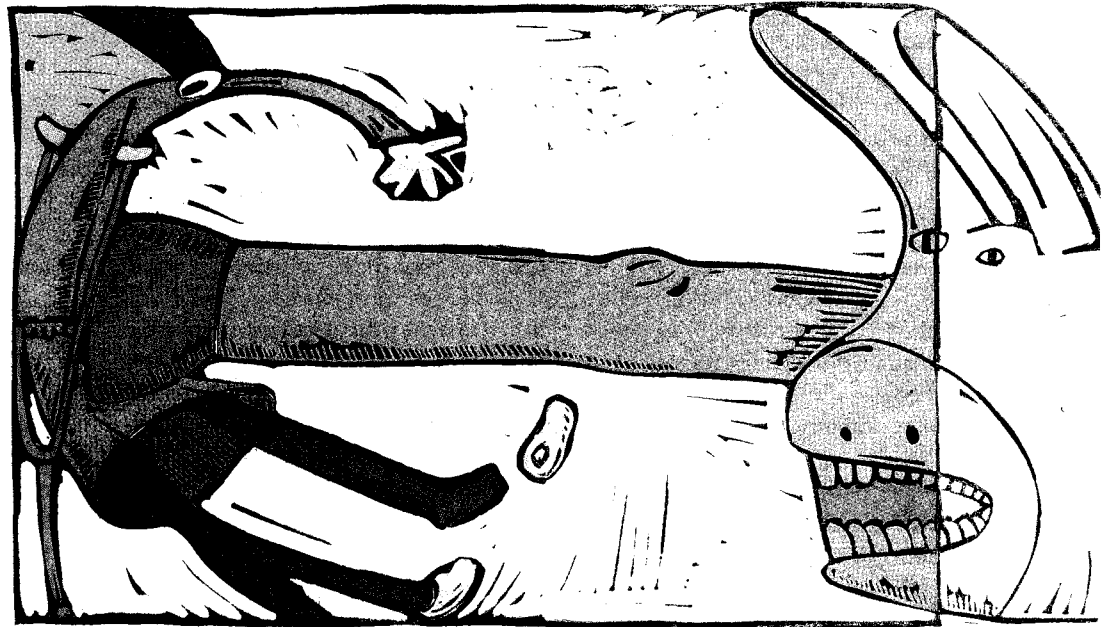
"Even though we had a process unlike any other that has drafted a bill," she told me, "—more open, more inclusive—we got labeled as being secretive because of . . . our failure to understand that we should be more available to the press along the way. That was something we didn't do well. . . . We were not aware of how significant it is to [shape] the inside story in Washington, in order to make the case . . . for whatever your policy is."

Secrecy toward reporters was stupid. But reporters are now acting as if it were something worse: closed-mindedness about ideas.

SECOND count: *The plan was politically naive.* Everyone now knows that the health-care reformers drew up their master plan without taking the slightest interest in what most Americans thought or felt. In reality, though, the plan suffered because the Administration was

publican arguments and how to rebut them, about the connection between a health-care bill and a re-election campaign in 1996. Week in and week out his memos to Bill and Hillary Clinton contained head counts of likely Senate and House votes—who was leaning, who could be pressured and pushed. In his conversations with me Magaziner seemed to spend half his time sizing up the legislators he had had to deal with: Senator X was in thrall to Bob Dole because of personal problems, Congressman Y had to start out opposing the bill because of donations from Interest Group Z.

Two fundamental decisions about the plan had much less to do with policy than with judgments of political reality. One involved handling the single-payer challenge. A Canadian-style single-payer system has two big virtues. It is simple to administer, since doctors, hospitals, and patients no longer have to worry about dozens of insurance companies with scores of different payment plans. The single-payer approach also guarantees that everyone in the country has medical coverage. But Clinton was dead set against a single-payer plan, arguing that it would require sweeping new taxes and would,



too attentive to shifting political moods.

Even before Inauguration Day, Magaziner was churning out memos about the right way to pitch the plan to editorialists and interest groups, about the likely Re-

in effect, abolish the entire medical-insurance industry. This left the political problem of how to deal with the hundred or so members of the House who supported some kind of single-payer plan.

Without them, no health bill of Clinton's could possibly pass.

Congress also contained a large number of supporters of market-reform and managed-competition plans. The main advantage of such plans is that they change the incentives of medical practice so that doctors, patients, and hospitals are more conscious of costs when making medical decisions. To get a plan passed, Clinton had to show that it would reform the medical market.

"We had to try to bridge the chasm" between these groups in drawing up the plan, Magaziner told me. "If we were serious about universal coverage, we felt, then the single-payer people would buy off even if they didn't like managed competition. We felt we were doing enough of the market reforms that the reform people would buy off too. And, by the way, we also thought that that was the best policy."

But by June of 1993 one of the main market-reform legislators, Representative Jim Cooper, of Tennessee, made clear that he wouldn't buy off. He recommended seeing to insurance reforms first and getting around to universal coverage in a few years. The single-payer group, of course, was not going to agree to that. "At that point," Magaziner said, "we knew that the only way we could try to bridge the chasm was to start a little bit left of center and try to negotiate toward the center."

"Left of center" meant proposing a benefits package a little more generous than what the Administration really wanted, setting the employer's share of total costs a little bit higher, making the limits on insurance premiums a little bit tighter. When the Republican Party lost interest in negotiating, this strategy became a liability, because it made the Clinton plan look more extreme than it was meant to be.

The other purely political calculation concerned sales strategy. Throughout his campaign Bill Clinton had emphasized the overall cost of medical care as a central evil of the U.S. system. Americans spend about twice as much money per capita on medical care as people in other developed nations, with results that are not twice as good. Whenever he was asked about cutting the budget deficit or taming the entitlements monster, Clinton said that the first and most important step

was to control health-care costs. This approach won the support of business, since health-insurance costs had for years been rising faster than any other business expense. (From 1948 to 1990, Paul Starr points out, business spending on health coverage rose by an average of 15.6 percent a year.) Through most of 1993, while the plan was being developed and unveiled, major business groups like the U.S. Chamber of Commerce and the National Association of Manufacturers supported its general outlines and accepted even its "employer mandates," which would require companies to pay most of the cost of coverage for their employees. But by the summer of 1994 the Administration was selling the plan mainly as a matter of fairness and security. Its slogan was "Health Care That's Always There."

In theory the Administration could have kept stressing both aspects of its plan—that it would make individuals more secure while reducing the strain on business. The peculiar logic of health-care economics, as revealed in most other developed countries and in American group-care systems, is that when everyone is covered, it becomes easier to control overall costs.

The Administration's political experts, however, recommended a more streamlined sales approach. Clinton's pollster, Stanley Greenberg, produced results in 1993 showing that no one believed that a government health-care plan could ever save money. Although opinion polls taken through the end of 1993 showed that most people supported the idea behind Clinton's plan (once pollsters explained what the idea was), most people also believed that the plan would drive costs up, not down. Therefore the more the Administration emphasized its cost-control themes, the less believable it would become. "The polls showed that people will trust the government to guarantee them security," Magaziner told me. "They will not believe that the government can control costs."

As Republican opposition to the bill increased in 1994, Democratic strategists decided that "security" would be a more effective, partisan rallying theme. "You have to mobilize people, and it's hard to mobilize people around words like 'cost containment' or 'universal coverage,'" Hillary Clinton told me. "So if we didn't

convince the middle class that universal coverage meant *them*, we wouldn't get the political support. . . . If you talked about how they could lose their job, how they are one divorce or one pre-existing condition away from losing coverage, then perhaps they would get engaged." By the end of the struggle this sales approach made the Administration even more vulnerable to Republican charges that it was putting out a bighearted, soft-headed, typically liberal plan.

One other enormously important, and almost purely political, decision sealed the fate of the bill. Magaziner and Hillary Clinton had hoped to present the bill to Congress a few months after the Inauguration, in the spring of 1993. Thanksgiving had nearly come before they were actually ready to present a finished bill. That delay had little or nothing to do with

*Hillary Clinton now
says that the news
blackout on emerging
details of the health-
care-reform bill was a
major mistake.*

the nuances of policy. It had everything to do with political necessity—and of a sort that everyone knew was sensible at the time.

THIRD count: "The First Lady's whiz-kids wasted precious months." This was how *The Economist* stated the next objection. Rather than getting busy and presenting the plan when the Administration still had a dewy glow, the health team sat around until it was too late.

The Administration's original strategy was to rush the health plan through as part of its first budget-reconciliation bill. That would have meant having detailed health proposals ready by April at the latest, and the task force had been geared toward meeting that deadline. The genius of this approach, little noticed by the public, is that it would have allowed the health plan to pass with a simple majority vote.

Congressional politics has quietly moved into the "supermajority" system that Lani Guinier was widely denounced for seeming to recommend. In theory it takes fifty-one votes to get a bill through the Senate. In reality it takes sixty votes to end a filibuster, so Bill Clinton knew that the Senate's forty-plus Republicans could stop nearly any legislation they chose.

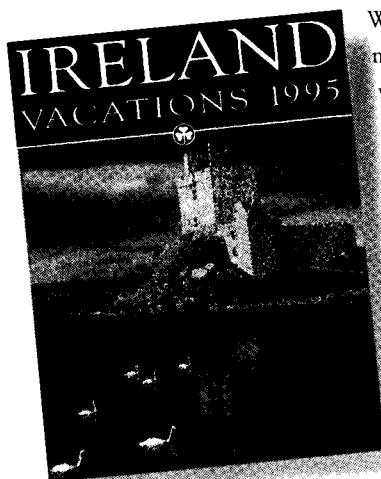
They could not stop budget bills. These come to the floor under rules that limit debate, and with only a fifty-one-vote majority required for passage. So if the health-care plan could be made part of the budget bill, the Administration could get it acted on quickly, with enough of its own party's votes to see it through.

The Senate's majority leader, George Mitchell, endorsed this strategy, but its de facto parliamentarian, Robert Byrd, objected, scuttling the plan. The Administration then decided that it would introduce the health-care plan as soon as the budget bill passed. But passage was the rub. The budget bill, with its big deficit-reduction package, was seen by everyone in Washington as a major early test of the Administration's strength. (The struggle over the bill is the subject of Bob Woodward's book *The Agenda*.)

The budget fight dragged on much longer than Bill Clinton had hoped or planned. As it became obvious that the final budget vote would be very close (on August 6 it finally passed the Senate 51-50, with Vice President Al Gore casting the deciding vote), the Administration wanted to avoid any extraneous controversy that might affect it. Clinton had been scheduled to make the final decisions about the health-care plan in late May. Because of fears that leaks about his choices would complicate the budget vote, the decisions were put off—a delay that had ripple effects lasting the rest of the year. Without Clinton's decisions, the task force could not prepare detailed legislation; without legislation, it could not start negotiations with congressmen and their staffs. Without final choices on what would be in the package, it could not prepare budget estimates; without those estimates, the Treasury and the Congressional Budget Office could not vet the plan.

By the fall the budget fight was over—but then NAFTA became the issue of the moment. Clinton had been scheduled to spend most of the month of October traveling and speaking about the health-care

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plan. As he was flying to his first event, a labor convention in California, news came that U.S. soldiers had been killed in Somalia. Clinton flew back to Washington after his speech and spent most of the month dealing with Somalia and NAFTA; he canceled all the other health-care events.

Despite the delays and missteps, when the President finally unveiled the plan, in September of 1993, it seemed to have a good chance. "The reviews are in and the box office is terrific," the political analyst William Schneider wrote just after it was presented. "President Clinton's health care reform plan is a hit. . . . The more people read and hear about the plan, the more they seem to like it."

Six weeks after the Inauguration, *Magaziner* had written a memo to Bill and Hillary Clinton saying that if health-care-reform legislation was not presented and passed immediately, it probably could not be passed during "your first term." With Republican midterm gains in Congress, it now appears that this prediction will be borne out. But the delay was neither negligent nor intentional. It is a reminder of how quickly events spin out of a President's control, and how rare it is for him to be able to advance his own agenda rather than respond to someone else's emergency.

FOURTH count: *The plan had delusions of grandeur.* Now we move to the substance of the plan, which has been described as a regulatory rat's nest, a nightmare of overambitious social engineering, and a sweeping solution where modest reforms would do.

The reality is that very little in this plan was new or unprecedented, and that it was barely more complex or comprehensive than most other plans.

When people complained that the plan was grandiose, they had three features in mind: universal coverage (everyone would be insured, whether working or not), community rating (everyone in a given region would pay the same premium for coverage, regardless of age or pre-existing conditions), and employer mandates (forcing businesses to cover much of the insurance cost).

All these ideas have been part of the health-care-reform debate for years. Universal coverage and community rating sound like bleeding-heart concepts, but they are based on tough economic reasoning. The idea behind both is that piecemeal reform of a health-care system can be worse than no reform at all.

The fairness argument for universal coverage is obvious. Even people who are poor deserve care when they are sick or hurt. This is why every developed nation except the United States offers universal care. The economic argument has become almost as familiar. Even people without health insurance ultimately receive treatment, when they show up in emergency wards; hospitals cover the cost by padding charges for everyone else. This backhanded form of coverage is neither economically efficient nor humane. As recently as the fall of 1993 Bob Dole was saying that universal coverage was a "non-negotiable goal of reform."

Community rating is a closely related idea. Every health-care-reform scheme in America is concerned with holding down costs. In most businesses market competition does the job, but competition in the health-insurance area often works in a perverse way. Insurance companies have tended to compete not by improving the incentives, habits, and nature of medical treatment—which in the long run is the only way to limit expenses—but by becoming choosier about whom they will insure. If they can limit their coverage to young, healthy people and rule out those who are already sick, then they can offer coverage at a lower price, without having done anything to improve the efficiency of care.

This is what has happened to the health-insurance business in the past generation. In the old days Blue Cross offered coverage to everyone in the same geographic area at the same price. Now younger, healthier people can get cheaper coverage—which many of them skip anyway,

figuring they don't need it—while prices rise for those most likely to need care. Fewer of them can afford to buy it, more must take advantage of the cruel and inefficient fallback of emergency-room coverage, and overall costs keep going up. The young, healthy people eventually become old and sick, and are caught too.

This cycle is known as adverse selection, and it has been talked about in the health-care-reform business for years. Community rating is the main response. It is designed to average each person's medical costs over the course of his or her whole life and to make sure that people have coverage at the times of their lives when it's most necessary. In proposing community rating the Clinton team was hardly making waves.

Even the part of the plan that sounded strangest and most radical, its "mandatory alliances," is already familiar to millions of Americans under a different name. Anyone who works for a big company or a state or federal agency knows about the open-enrollment system for selecting health insurance. The company or agency negotiates with HMOs, insurance companies, and local medical networks that want to offer coverage to its employees. Once a year employees choose which plan they want. The employer then deducts money from their paychecks, adds its own share, and passes the money on to the medical providers.

This, with small variations, is also how the task force's mandatory alliances would have worked. They would have taken bids from insurance companies, HMOs, and other health providers and then let each household choose the plan it liked best. Each provider would have been required to set a price for a standard benefits plan, so that customers could make easy price comparisons among the offerings. The alliances would not, as has often been assumed, have tried to provide medical care themselves, through big new government clinics.

The most ominous-sounding aspect of the new alliance system was its "mandatory" nature. Everyone would have been obliged to choose and buy a standard benefits plan from an alliance. (Contrary to repeated claims by opponents of the bill, people would have been free to buy any extra coverage they wanted, or get any additional treatment from any doctor they chose, as long as they did it with their own

According to the peculiar logic of health-care economics, when everyone is covered, it becomes easier to control overall costs.

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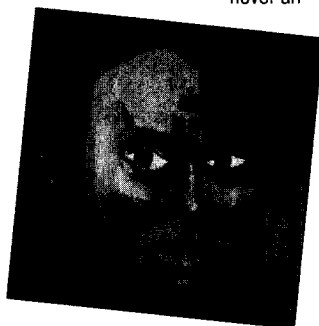
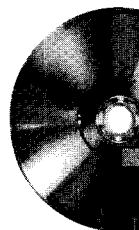
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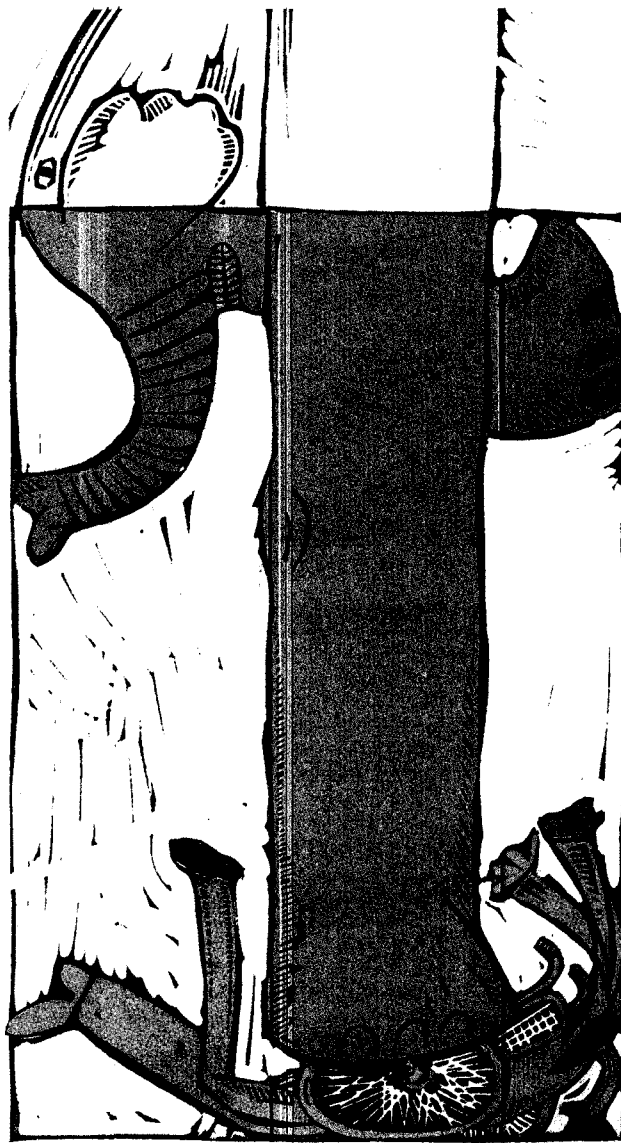
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money. Employers would also have been free to offer additional coverage.) The health-care task force argued that the alliances had to be mandatory in order to create the community-rating effect. Otherwise, young, healthy people would stay out of the system, and the pernicious cycle of adverse selection would begin. An exception was made for employees of very large companies, who would still have been able to buy through their own firms' open-enrollment plans. The reasoning was that a General Motors or an AT&T had a work force large and diverse enough to constitute a community-rating pool all by itself. Everyone would have been forced into a pool one way or another.

Some health-care-reform plans have no mandatory component. Several versions of managed competition, for instance, would set up alliances like those in the Clinton bill but not require anyone to buy from them. It is virtually impossible, though, to achieve universal coverage without some element of compulsion. (Medicare offers universal coverage for those over sixty-five, but everyone who works is compelled to pay a Medicare tax.) Moreover, Magaziner argued, for most people the mandatory system would in practice mean more choice and freedom than they now enjoy.

When he ran a small business in Rhode Island, Magaziner said, he covered all health-insurance costs for his employees but could give them only two plans to choose from. Handling the bidding and paperwork for a broad range of plans would have been impossible. "If there had been an alliance, I could have paid my dues to the alliance and let people choose among all the plans." The alliances in the Clinton bill would have been required to offer customers a choice among all plans that met basic certification requirements. In big cities a dozen or more plans might be available. The minimum offering would be three kinds of coverage, including at



least one fee-for-service plan that would permit a family to stay with the independent doctor it had been using.

After the plan was withdrawn, Uwe Reinhardt, an economist at Princeton University, told *The New York Times*, "No one understood this, but the average American patient would have had more choice under the Clinton plan than they now will. If you work for a particular company, your choice of HMOs is whatever that company offers you." Some critics argued that the Clinton plan would destroy the market for coverage beyond the plan's basic benefits, and that as a result people would find it difficult to buy as much coverage as they might like. But that is different from the widespread belief that extra coverage would be against the law—and for most people the range of choice would probably be broader under Clinton's plan.

Far from concocting a system that would look and feel radically different from what Americans were accustomed

to, the task force believed that it was changing the surface of health care as little as possible while altering its underlying economic structure. The alliance system, despite its strange name, was meant to look familiar to people who already had coverage. The employer-mandate system of finance, in which companies would bear most of the health-insurance costs, reflected the fact that 90 percent of the people who now have insurance (excluding those on Medicare) get it through their employer. The employer mandate is a de facto tax but a well-established one, and a familiar concept in health-policy circles. Many Republicans, including Robert Packwood and Richard Nixon (!), have over the years endorsed employer-mandate plans.

Indeed, none of the individual elements of the Clinton plan was a shocking new entrant into the health-care debate. The plan's system for controlling expenditures,

through premium caps that limited how fast the cost of basic coverage could rise, departed from Paul Starr's recommendations. But it closely resembled a plan offered by a group of congressional moderates that included the Republican senators John Danforth and Nancy Kassebaum.

To say that the resulting package of proposals was "too complex" is like saying that an airplane's blueprint is too complicated. The Medicare system is complex. So is every competing health-care-reform plan. Most of the 1,342 pages of Clinton's Health Security Act (which I have read) are either pure legal boilerplate or amendments to existing law. Conventional wisdom now holds that the sheer bulk of the bill guaranteed its failure. The NAFTA bill was just as long, and so was the crime bill that passed last summer. If the health bill had been shorter and had not passed, everyone would know that any proposal so sketchy and incomplete never had a chance.

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FIFTH count: *It was a coercive approach to one seventh of the economy—and to a problem that was solving itself.*

Much of the problem for the plan seemed, at least in Washington, to come not even from mandatory alliances but from an article by Elizabeth McCaughey, then of the Manhattan Institute, published in *The New Republic* last February. The article's working premise was that McCaughey, with no ax to grind and no preconceptions about health care, sat down for a careful reading of the whole Clinton bill. Appalled at the hidden provisions she found, she felt it her duty to warn people about what the bill might mean. The title of her article was "No Exit," and the message was that Bill and Hillary Clinton had proposed a system that would lock people in to government-run

To say that the resulting package of proposals was "too complex" is like saying that an airplane's blueprint is too complicated.

care. "The law will prevent you from going outside the system to buy basic health coverage you think is better," McCaughey wrote in the first paragraph. "The doctor can be paid only by the plan, not by you."

George Will immediately picked up this warning, writing in *Newsweek* that "it would be illegal for doctors to accept money directly from patients, and there would be 15-year jail terms for people driven to bribery for care they feel they need but the government does not deem 'necessary.'" The "doctors in jail" concept soon turned up on talk shows and was echoed for the rest of the year.

These claims, McCaughey's and Will's, were simply false. McCaughey's pose of impartiality was undermined by her campaign as the Republican nominee for lieutenant governor of New York soon after her article was published. I was

less impressed with her scholarly precision after I compared her article with the text of the Clinton bill. Her shocked claim that coverage would be available only for "necessary" and "appropriate" treatment suggested that she had not looked at any of today's insurance policies. In claiming that the bill would make it impossible to go outside the health plan or pay doctors on one's own, she had apparently skipped past practically the first provision of the bill (Sec. 1003), which said,

Nothing in this Act shall be construed as prohibiting the following:

(1) An individual from purchasing any health care services.

It didn't matter. The White House issued a point-by-point rebuttal, which *The New Republic* did not run. Instead it published a long piece by McCaughey attacking the White House statement. The idea of health policemen stuck.

So did the idea that one seventh of the national economy would be transformed overnight. Of the vast American commerce in health care, more than 40 percent is already paid for by the federal government, mainly through Medicare. Under the Clinton plan the rest of the money would still go through most of the insurance companies, HMOs, doctors, hospitals, and laboratories that are receiving it now.

THE final element in the conventional wisdom is that this cumbersome, flawed plan was in any case unnecessary, because the health-care problem was going away. Medical costs rose by "only" 5.9 percent in 1993—yet that was more than twice as fast as wage growth and almost twice as fast as the overall inflation rate. Over the past several decades medical costs have risen about three percent faster than the overall inflation rate; in 1993 the gap was 2.9 percent.

"There is no persuasive evidence that we are in either a stabilized or an improving health-care-financing environment," Hillary Clinton told me. "In fact, many of the problems will only continue to get worse. The problems that middle-class Americans care the most about—like what doctor they can see—will likely become appreciably worse, because many will be forced into managed care over which they have no say. Employers will

make those decisions. They will pay more for fewer benefits. How deeply this sinks in and how much it motivates political action, I don't know."

IF this plan did not perish because it had been designed in intolerable secrecy, or because its designers knew nothing about politics, or because it was full of unacceptable new ideas, or because it was so much more complex than any predecessors, then what happened to it?

The Administration's view, for which, again, there is ample evidence, is that it went down because of two zero-sum games, one political and one economic. Health-care reform became a battle in which some would win and others would lose—and Clinton lost.

Through most of 1993 the Republicans believed that a health-reform bill was inevitable, and they wanted to be on the winning side. Bob Dole said he was eager to work with the Administration and appeared at events side by side with Hillary Clinton to endorse universal coverage. Twenty-three Republicans said that universal coverage was a given in a new bill.

In 1994 the Republicans became convinced that the President and his bill could be defeated. Their strategist, William Kristol, wrote a memo recommending a vote against any Administration health plan, "sight unseen." Three committees in the House and two in the Senate began considering the bill in earnest early in the year. Republicans on several committees had indicated that they would collaborate with Democrats on a bill; as the year wore on, Republicans dropped their support, one by one, for any health bill at all. Robert Packwood, who had supported employer mandates for twenty years, discovered that he opposed them in 1994. "[He] has assumed a prominent role in the campaign against a Democratic alternative that looks almost exactly like his own earlier policy prescriptions," the *National Journal* wrote. Early last summer conservative Democrats and moderate Republicans tried to put together a "mainstream coalition" supporting a plan without universal coverage, without employer mandates, and without other features that Republicans had opposed. In August, George Mitchell, the Democratic Party's Senate majority leader, announced a plan that was almost pure symbolism—no

employer mandates, very little content except a long-term goal of universal coverage. Led by Bob Dole and Newt Gingrich, Republicans by September were opposing any plan. "Every time we moved toward them, they would move away," Hillary Clinton says.

"We always knew that in the end people's trust of the President and First Lady would be crucial," Ira Magaziner says. "The debate was going to be complicated, and that trust factor was very important." Whitewater eroded the trust factor. The President looked beatable, and he lost.

Economic factors counted too. Doctors had fought bitterly against Medicare in the early 1960s, but for the most part they sat this battle out. If they weren't controlled by the government, they would be controlled by insurance companies, which in some ways were worse. But other interest groups had more to lose. Health-insurance agents would be put out of business. Health-insurance companies could have their premiums capped. For-profit hospitals thought they would lose money. Manufacturers of medical equipment thought that market growth might slow. Large businesses that did not already offer health care for workers knew the employer mandate would cost them money. (These were mainly corporations like PepsiCo and General Mills, which own restaurant chains whose part-time workers are uninsured.)

During the 1992 campaign the Clinton war room excelled at answering negative charges immediately, before damaging impressions could set in. But even flatly untrue attacks on the health plan went unanswered—direct-mail campaigns saying that everyone would have to go to a government clinic, daily doses of misinformation from Rush Limbaugh, TV advertisements fanning McCaughey-style fears of jail terms for people who wanted to stick with their family doctor. Last March *The Wall Street Journal* found that a panel of citizens preferred the provisions of the Clinton plan to the main alternatives—when each plan was described by its contents alone. But when pollsters explained that the preferred group of provisions was in fact "the Clinton plan," most members of the panel changed their minds and opposed it. They knew, after all, that Clinton's plan could never work. ☛

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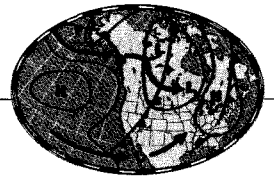
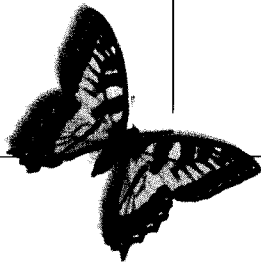
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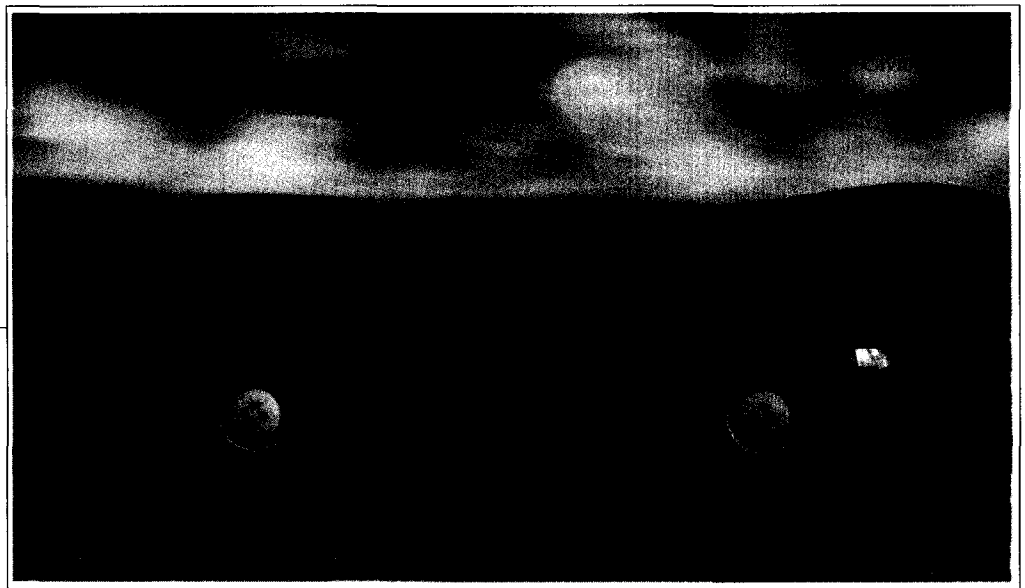
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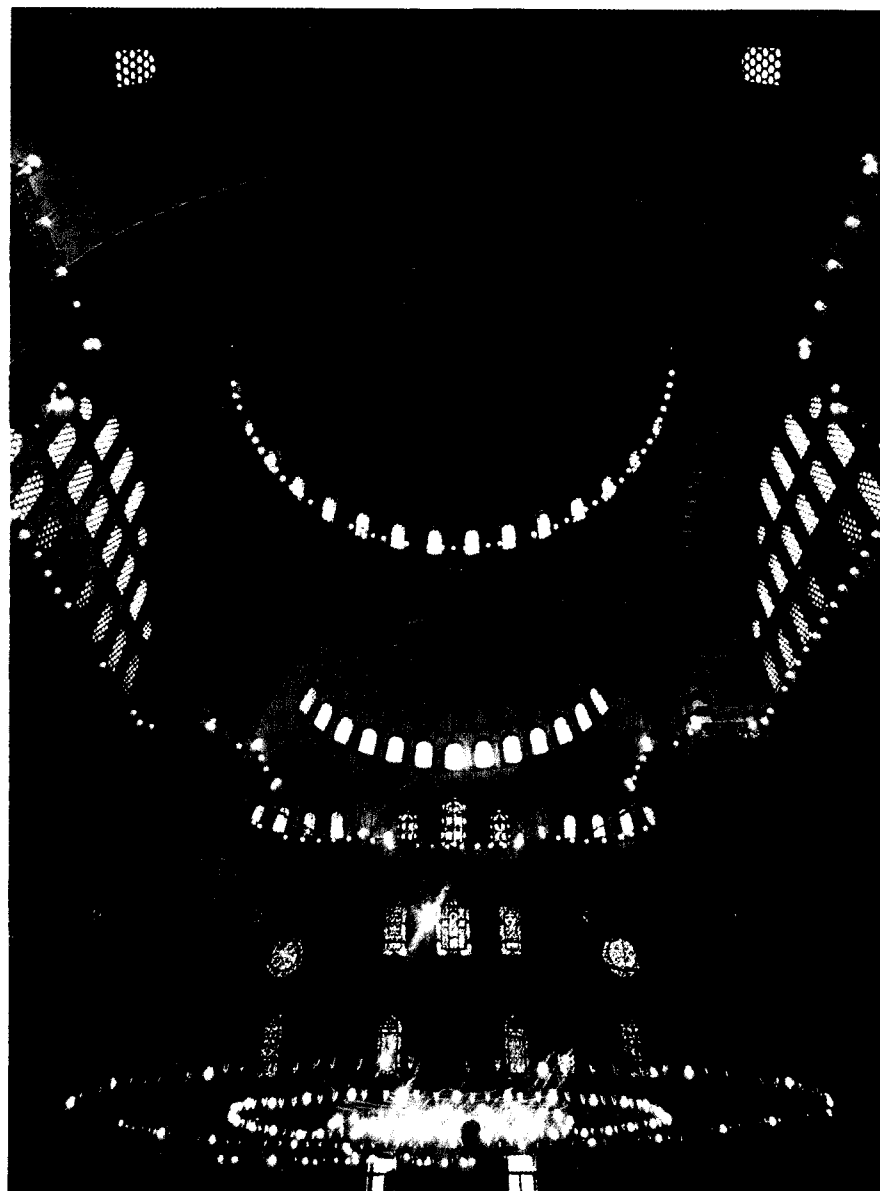
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THE streets of Istanbul are dirty and the traffic is impossible, and Turkish is as baffling as Hungarian, to which it is related—you'll have more luck with German, however rusty, than English. If you get lost, you're in trouble. I'd go back in a minute. In the course of a ten-day visit I re-

by Corby Kummer

cently made, Istanbul lodged in my soul. Before I went, I had heard Istanbul described as being like Rome in the late fifties, and when I got there, I saw why. In the chaos of people rushing to the office or the street market or the mosque there is an overarching sense that a city with a glorious past half-buried by

grime and neglect is about to emerge as a world capital. The city's population has nearly septupled since the fifties, and now many of the new arrivals are hopeful emigrants from Eastern Europe. Scene-conscious Parisians and, yes, Romans are buying second (or third or fourth) houses in deliciously seedy Edwardian and Art Nouveau neighborhoods. Life is still cheap, the excellent traditional food is mostly untouched by foreign influence, and bars and cafés (although not restaurants) stay open late.

The tension between proud anachronism and make-it-up-as-you-go style hits you as soon as you step out on the street. Everyone seems alive to possibility. In the course of one evening's stroll I saw both traditionally and daringly dressed young people, European tourists in various worldly guises, rough-hewn young men in boisterous conversation at a street market, and a big group of transvestites with strong New York accents raucously piling into a *dolmuş*—one of the fleet of meticulously maintained fat fifties American cars that serve as group taxis—and dishing each other as they predicted who would win the competition they were headed for.

THE ideal way to arrive in Istanbul would be to sail in at dusk, when the distractions of the day are blunted and the city wears its storybook face. First you cruise along the Bosphorus, the strait that divides Europe and Asia—the city sits on both continents; tourist sights and shops are on the European side, and quieter residential districts are on the Asian, or Anatolian, side. Then you round the Golden Horn and enter the harbor that made the site a natural center of commerce and a natural choice for the eastern capital when the Roman Empire was divided, at the end of the fourth century.

The two buildings most tourists first visit dominate the view of the old city: the Hagia Sophia, the sixth-century basilica whose great dome and vast covered space remained unequaled the world over for a thousand years, and beside it the Blue Mosque, or Sultan Ahmet, the Ottoman

The serene, perfect space of Süleymaniye, Sinan's masterpiece



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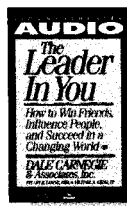
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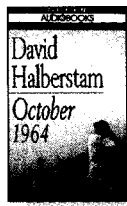
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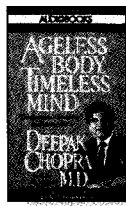
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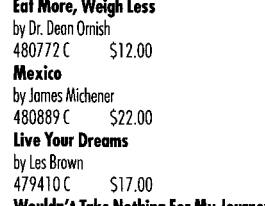
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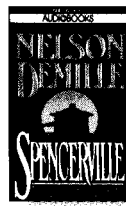
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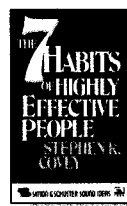
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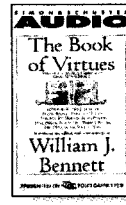
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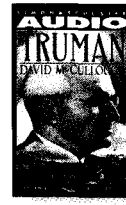
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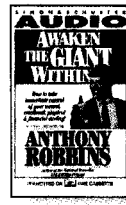
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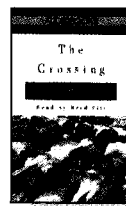
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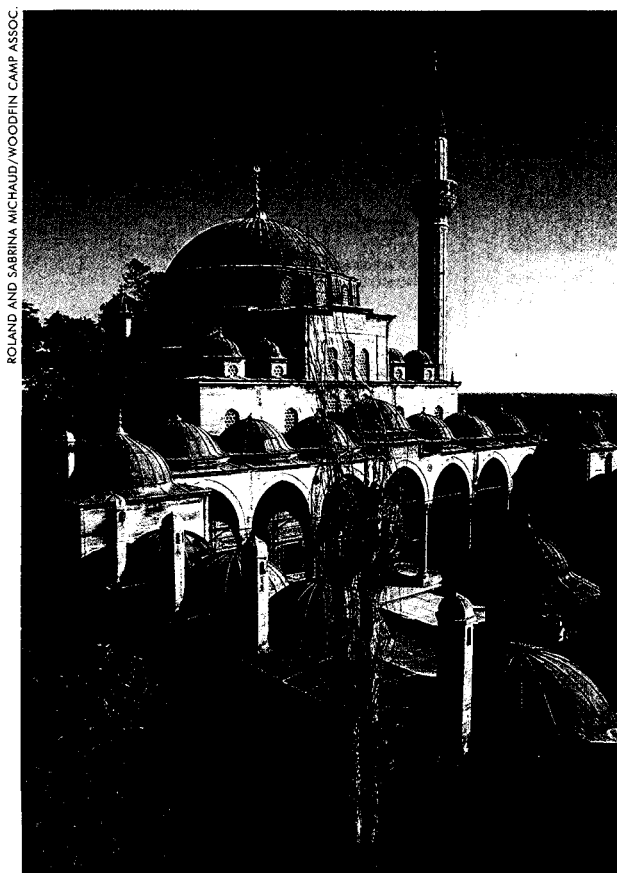
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response to the architectural challenge that the church—by then converted to a mosque—presented. Up and down the hill are more floodlit gray-white marble mosques, their cascading domes and half domes and sharp minarets so much the stuff of Arabian-nights fantasies that it is startling to realize their form derived from a church and was refined only in the 1500s, just when Renaissance architects, too, were surpassing the feats of the ancients.

I decided during my explorations that a first-time visitor should postpone the greatest-hits lists found in guidebooks and organize his or her discovery of the city by following the work of the architect who defined Istanbul. Mimar Sinan (1489–1588) was fixated on the Hagia Sophia, and in his lifelong efforts to exceed its achievements he created some of the world's most beautiful buildings. Dwelling for a time in their serene, perfect spaces is the best route to understanding the city. Too, visitors can enter mosques during services—something forbidden in most non-secular Islamic states (Turkey is secular).

Above, a Byzantine mosaic at Kariye; below, Sokollu Mehmet Paşa mosque



ROLAND AND SABRINA MICHAUD/WOODFIN CAMP ASSOC.

Sinan's masterpiece is Süleymaniye, the mosque named for his chief patron, Süleyman the Magnificent. So mesmerized was I by the interior—there's a kind of secret garden behind, with lovely tomb buildings—that I stayed far longer than I had intended. Across the street from Süleymaniye, half hidden by a stone screen and trees, is the movingly restrained tomb of Sinan himself. In the unrenovated neighborhood down the hill behind the Blue Mosque—one of the few areas of central Istanbul in which wooden houses from the turn of the century remain—is the tiny Sokollu Mehmet Paşa Camii (*camii* means "mosque"), designed by Sinan and as perfect as Süleymaniye.

Also first-rate but usually given secondary importance in guidebooks is Kariye, built as the Church of St. Saviour in Chora ("the country"), fifteen minutes by taxi from the old city. From 1315 to 1321 Kariye was rebuilt, and mosaics and frescoes of the lives of Christ and the Virgin were installed—among the most spectacular works of Byzantine art extant, recalling Giotto in their depth and expressiveness (they are contemporaneous, if half a continent away). Seen at close range on the walls and fluted domes of the small church, the mosaics and frescoes overpower you.

THE sprawling Topkapı Palace deserves its must-see status, but it is best visited in carefully planned forays. The most logical first move after entering is to traverse two of the four sequential courtyards and find the line to pay the separate admission to the harem. The secret, teeming life within the harem (the word means "forbidden" in Arabic) inspired Western artists and

writers for hundreds of years, especially in the eighteenth and nineteenth centuries, when the Ottoman Empire was on the wane and palace intrigue grew ever more lurid. The former kitchens, with enchant-

ing rows of onion-dome ceramic chimneys designed by Sinan, house one of the world's great collections of Chinese porcelain, and I returned several times to see it. I quickly walked out of the treasury, however. This is where you find the famous thrones and scimitars and headdresses encrusted with softball-sized gems, all of

which look fake, and the emerald dagger from the film *Topkapi*, which gyrates like a mechanical fortune-teller's head.

The rich beauty produced under the auspices of the sultans is better seen at the Çinili Köşk, a pavilion now devoted to ceramic art which is part of the archaeological museum complex a five-minute walk from Topkapı, or at the Museum of Turkish and Islamic Art, across from the Blue Mosque. Also superb are the floral Iznik tiles in the Rüstem Paşa mosque, a late work by Sinan right in the center of the old city. These, too, are unjustly accorded secondary status.

EVERYONE will tell you to visit the Grand, or Covered, Bazaar (Kapalı Çarşı), the heart of the old city, itself a city: there are said to be more than 4,000 shops in its fifty acres. But few will warn you flat out against buying a rug, for which you'll likely pay more than you would at home. You simply won't win the game of bargaining. The best values are silver and gold, which are sold by weight no matter the age or the amount of ornamentation. If you're serious about antiques or miniatures and willing to pay for good ones, bypass the many shops in the bazaar and go to Sofa, on the elegant nearby shopping street Nuruosmaniye.

The bazaar's maze of streets, interrupted by tea stands and old coffee houses, seems thrillingly confusing, but in fact you're never more than a five-minute walk from a way out. The adjoining Egyptian Spice Bazaar (Mısır Çarşısı) drew me not only for its dozens of kinds of olives and other foodstuffs but for the wonderful Kurukahveci coffee shop, with



R. AND S. MICHAUD/WOODFIN CAMP ASSOC.

its original 1930s decorations and odors of roasting coffee that reach far beyond the shop's central corner location. My take-home purchases in the bazaar were superior pistachios, dried figs, saffron fanned like a peacock's tail inside round plastic containers like petri dishes, and Iranian caviar sold in tins and vacuum-sealed in plastic for extra-safe storage. I found excellent quality and very good prices at Acar, a shop that takes up two large spaces in the bazaar.

The best place to stay is in the modern part of the city, across the harbor from the Golden Horn, near Taksim Square. Even if this isn't where the sights are, it's where the better restaurants and most of the contemporary city's life are. The Atatürk Cultural Center, where you can find ballets, concerts, and operas, runs along one side of the square. Here the hotels are modern, with the exception of the Pera Palas Hotel, whose Art Nouveau train-station grandeur is probably better viewed at tea in the marvelously restored café, or at dinner, than from one of the rooms, which are said to be noisy and unreliably renovated.

I stayed at the Hilton, a handsome 1950s International Style building in its own large private park a five-minute walk from Taksim Square, and I would stay there again for its luxurious calm and central location, even if the service did need sharpening and the big rooms refurbishment (some recently got it). Business travelers not on budgets prefer the modern Swissôtel, on the water in a less central part of Taksim; those who really want to splurge stay at the Ciragan Palace Hotel Kempinski, a showily restored Ottoman palace from the past century, which is too opulent for my taste.

Istanbul's food, much of it blessedly based on long-cooked vegetables, is often wonderful and, except at a few pretentious restaurants, is served in simple surroundings that provide few clues to its quality. (Don't drink the water or eat unpeeled fruit: take it from someone who did.) Every restaurant serves a plentiful selection of *meze*, or antipasti, from which I

made up most of my meals. The many cooked salads contain an abundance of vegetables we associate with Italy, along with components more familiar farther east, such as red-pepper paste, walnut sauces, grape leaves, cracked wheat, yogurt and feta cheese, and sweet spices in savory dishes; these refined cuisines, of which Turkish is likely the greatest, are beautifully traced in Paula Wolfert's new *The Cooking of the Eastern Mediterranean*. The waterfront restaurants of Karaköy specialize in fresh grilled fish—the dinner most visitors, and residents, prefer. I liked the soups and stews at Hacı Abdullah, near Taksim Square, a simple cafeteria-style restaurant where I bought many homemade jams from the shelves that line the entranceway.

My survival food was *simit*, big dark rings of sesame-covered bread stacked on pushcarts all over the city; vendors carrying wooden trays laden with them, often still warm, are a frequent and welcome sight. A *simit* is more than a sesame bagel ever dreamed it could be.

The Berlitz guide is concise and helpful, the Rough Guide far more thorough and very well written; unusually, the Cadogan Guide is slapdash. The new Knopf guide, characteristic of the snappily designed French series, has exciting color pictures on every page but is confusingly organized. Istanbul hands swear by *Strolling Through Istanbul*—a daunt-

ingly complete guide, like Giulio Lorenzetti's to Venice, that is not for the traveler who has very limited time or who expects up-to-date information. But it is invaluable for learning about the small and seemingly undiscovered mosque before you.

When you need a break from walking, spend a day on the ferry that zigzags

along the Bosphorus (there are two departures a day from a pier in the old city). Even if this is how many Istanbulers get to and from work, everyone seems to be on holiday, gossiping, eating fresh yogurt in glasses and drinking the hot tea that vendors sell, pointing out to each other the palaces and fortresses and mosques and gingerbread houses and estates. The fare is about a dollar. I don't believe I've ever taken a pleasanter cruise. ☸



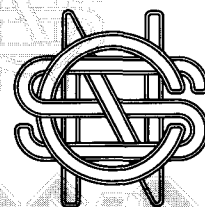
SNOWDON/HOTEL/WOODFIN CAMP ASSOC.

An Iznik tile at Topkapı Palace

remasterpieces

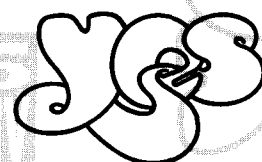
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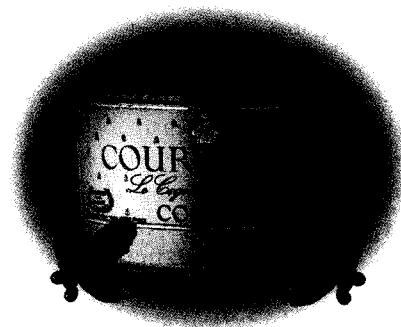
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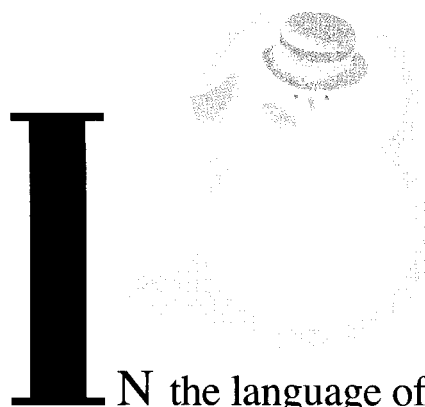


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IN PRAISE OF SNOW

by CULLEN MURPHY

*Watching it, understanding it, forecasting it,
predicting how much water is in it—all this is a surprisingly
large and intricate undertaking, one on which
our society urgently depends*



IN the language of the Irish, scholars say, there are a dozen words for “peat.” In the language of the Arabs, we’ve been told, there are many words for “sand.” I, for my part, grew up speaking a language in which there are perhaps a hundred terms for “snow,” and I am not a native of Igloolik.

I learned some of those terms from a man named Mark Williams, a former ski-lodge operator who is a geographer at the University of Colorado and a specialist in the properties of snow. “If you’re talking about snow crystals in the atmosphere,” he told me recently, “well, then, there are scores of terms. There are needles and sheaths and columns. There are pyramids. Cups. Bullets. Plates. Scrolls. Branches. Dendritic crystals. Stellar crystals.” And those are just some of the basic forms. Snow crystals also come in combinations. Stellar crystals with plates. Dendritic crystals with branches. Hollow bullets. Bullets with dendrites. Plates with scrolls. Plates with spatial dendrites. Rimed particles. Rimed needle crystals. Lump graupels. Graupel-like snow with nonrimed extensions. Some of the names of snow crystals (branches,

needles, bullets) are appropriately suggestive: in high wind, snow crystals can be as abrasive as sand.

After snow has fallen, the name for it picks up additional qualifiers as it begins to settle or drift, as heat and cold and wind and moisture and the snow’s own weight begin to make their influence felt. Freshly fallen snow starts out as what Williams calls an “ice skeleton”—a loose scaffolding of crystals amid an enormous volume of air. To give his students an idea of the ratio of snow to air in a fresh snowfall, Williams has them compress a family-sized loaf of Wonder Bread to its smallest possible size. (It can be reduced to a two-inch cube.)

In fresh snow air can pass with little obstruction from the atmosphere through the snowpack to the ground: given life by differences in the temperature gradient, the snowpack

breathes. But time changes that. The snow may metamorphose into what is called equitemperature, or ET, snow. This is snow at its most stable, the delicate crystals having matured into hardy granules in a snowpack of homogeneous temperature. It may turn into melt-freeze snow, more commonly known as corn snow or spring snow. Where the snowpack meets the warmer ground, there may form a weak and porous stratum of what is known as kinetic snow or sugar snow or depth hoar—by whatever name, the mother of avalanches. If the snow survives for more than a year, it may begin hardening into something called firm, which is a step on the way to becoming glacial ice.

I met Mark Williams and a good many of his colleagues at last year's meeting of an organization called the Western Snow Conference, a gathering that occurs every spring when the season's snows are more or less over and the period of snowmelt is well under way. Collectively, the people who attend the Snow Conference meeting—hydrologists, geographers, meteorologists, biologists, chemists, agronomists, utility-company officials, state and federal government officials, representatives of Indian tribes—are known in the gray language of official reports as the "snow-resource community." They are interested in every aspect of the hydrologic cycle of snow, from the formation of the first crystals to the accumulation of snowpack to the onset of snowmelt to the release of the last drops of runoff into the Pacific Ocean or the Gulf of Mexico. They are interested in avalanche theory, in the seeding of clouds with silver iodide to induce snowstorms, in how to add certain bacteria to water so that ski resorts can make snow at higher temperatures. For decades they have been interested above all in the following questions, which turn out to be complicated ones: How much snow has fallen in the western United States in a particular winter? How much water will it turn into? Where will that water go?

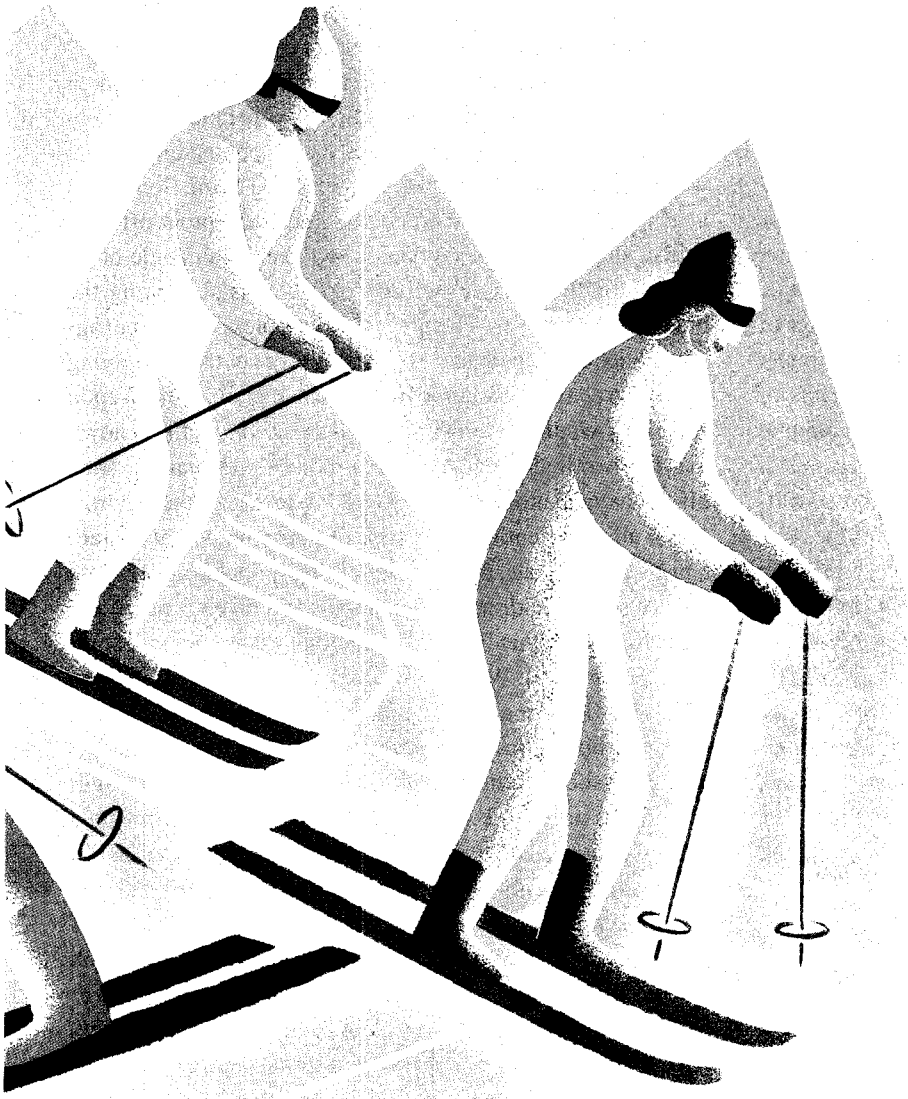
SNOW DEPENDENCY

SNOW is a commodity we usually remember for either the pleasures it offers or the disruptions it causes. We call upon snow, too, for its utility as metaphor: symbol of purity, uniformity, isolation, protection, transience. We tend not to think about snow as the crucial variable upon which urban life and agricultural life in much of the world, particularly the United States—and especially the American West—happen to depend. Indeed, snow is largely missing, as the historian Bernard Mergen observes in a forthcoming study, from recent histories of water policy, in which one would expect it to play a highly visible role. And yet snow, hardened into glaciers, covers 10 percent of the planet's land area. Fresh snow falls each year on nearly one square mile of dry land out of every four; in the Northern Hemisphere the figure is one square mile out of two. Worldwide, at least a third of all the water used for irrigation

comes from snow. In the western United States the figure is about 75 percent.

What makes snow important is not only its volume but also its relative dependability. Much of the West is in a state of drought or near-drought, with snowfall having been below normal in seven of the past eight years. In general, though, snow can be far more reliably counted upon to fall in substantial amounts in the mountains during wintertime than rain can be counted upon to fall in the spring and summertime. And snowmelt flows onto the scene at nearly the most useful time of year, having been stored at high altitudes until the weather warms and the demands of agriculture begin to make themselves felt. It is snow that powers the great rivers of the West—the Colorado, the Rio Grande, the Columbia, the Missouri—on their long journeys through sometimes parched or semi-arid terrain, ribbons of brown and silver that at times enverdure entire basins, at times support the merest Nilotic fringe of green. How much water does the





Paul Leith

West's winter snow turn into? The snowmelt that finds its way into the Columbia River alone in an average year comes to 26 trillion gallons, which is 81 million acre-feet—enough to cover all of Kansas in knee-deep water, or to raise Lake Michigan by almost six feet.

The Western Snow Conference typically holds its meetings someplace in sight of the mountains, where in springtime one can have a ready glimpse of snow. I was invited to attend the sixty-second annual conference, in Santa Fe, New Mexico, by a friend who is a hydrologist in California. I'm not sure why the prospect held such appeal, unless it is simply that snow is my favorite kind of weather. The first article I ever published, on a small printing press given to me on a snowy Christmas when I was six or seven, consisted of what was meant to be a report on snow depth in inches, and was distributed to neighbors. It read, in its entirety: "The snow 15." Snow seems to come into my life in the form of memorable coincidences. The Horatian ode

"*Diffugere nives . . .*," about the melting of snow in springtime, was the first piece of Latin verse I ever translated completely on my own (it appeared on a test), an achievement that occurred at roughly the same time as my first reading of James Joyce's short story "The Dead," whose most famous words, in the haunting conclusion, are "snow was general all over Ireland." Snow makes me feel as snug as a vole. There were ten major snowstorms in my region of New England last winter, and I contentedly wrote a check to the snowplow man each time.

The focus of the Western Snow Conference's Santa Fe meeting was "Climate Change Effects on Snowmelt Water Supply," a big and important subject, but that was by no means the whole agenda. "Northern Latitude Snow Pillow Installation Procedures." "Snow Accumulation and Ablation Under Fire-altered Lodgepole Pine Forest Canopies." "Snow Chemistry and Physics of the Mogollon Rim in Arizona." There was something here, I realized, for even the most jaded of tastes. At lectures and in associated readings I picked up such arcane pieces of information as that a two-foot square of snow ten inches deep contains about a million snowflakes, and that

if the potential precipitation in the earth's atmosphere at any given moment fell all at once, it would cover the entire surface of the planet to a depth of one inch. I was pleased to observe that, as with any professional group that has reached a certain level of maturity, the membership of the Western Snow Conference includes people who display what might be called occupational anthroponymy—that is, whose names resonate with their line of work. I ran into a Phyllis Snow and a Neil Berg, and discovered that a type of diagram used to show inflows and outflows from reservoirs was devised by a man named Rippl.

During my days at the Snow Conference meeting I also grew to admire the pluck and ingenuity of those charged with keeping track of our snow. It has been nearly ninety years since James E. Church fashioned his first snow tubes and began taking wintertime measurements in the mountains of Nevada. Some things haven't changed very much since that time, and some have changed profoundly.

FALLING CRYSTALS

“THERE is no material of engineering significance that displays the bewildering complexities of snow.” I came across that matter-of-fact statement in the *Handbook of Snow*, an invaluable if glacially paced compendium edited by the eminent Canadian hydrologists D. M. Gray and D. H. Male. The formation of snow begins when water vapor or a supercooled droplet of water forms an ice crystal, almost always hexagonal in shape, around a nucleus consisting of one of the thousands of minute aerosol particles to be found in each cubic centimeter of the lower atmosphere—clay silicate, perhaps, or bits of volcanic ash, or material of extraterrestrial origin. From that moment on, the life of an ice crystal can be played out in various ways. The crystal may fall to the ground in its original form, as it does in the intensely cold regions of the Arctic and Antarctic. Or, more frequently, the ice crystal may grow into a snow crystal, gaining substance by means of sublimation—water vapor turning directly into ice, without passing through a liquid stage. Its shape, or “habit,” will be determined mostly by temperature and the amount of water vapor in the air. As snow crystals descend, they may meet up with one another, forming aggregations. We know these as snowflakes. Or a snow crystal may in its descent encounter supercooled water droplets. Riming can then occur, as the droplets freeze immediately upon contact with a solid body. If the riming is substantial, the crystal may become graupel, or snow pellets.

All this activity has a powerful cleansing effect on the atmosphere—“washout” and “snowout,” as two of the associated processes are called. A heavy snowstorm gathers particulate matter to itself and drags it to the ground, thereby preserving, until the snow melts, a sample of the atmospheric chemistry prevailing when that particular snowstorm began—a sample that speaks of climatic conditions generally and may speak more specifically of pollution. In the remote interior of Greenland, where the deposits of snowstorms do not disappear, such records go back a long way. A few years ago researchers at the Greenland Icecore Project drilled a hole through the Greenland icecap all the way to bedrock and extracted a core of ice that, if reassembled, would be close to two miles long. The ice at the bottom of the borehole is believed to have been formed from snow that fell some 200,000 years ago.

The symmetry of ice crystals was commented upon by the Chinese in the second century B.C. Europeans had recorded the same observation at least by the Middle Ages. The intellectual pedigree of snow scholarship in the West is distinguished. The Dominican scholastic Albertus Magnus wrote about snow crystals in the thirteenth century. At the beginning of the seventeenth century the same subject beguiled Johannes Kepler. “There must be some definite cause,” he wrote in 1609, shortly after making the discovery that the

planets travel not in circles but in ellipses, “why, whenever snow begins to fall, its initial formation invariably displays the shape of a six-cornered starlet. For if it happens by chance, why do they not fall just as well with five corners or with seven?” In his pamphlet Kepler drew parallels with honeycombs and the pattern of seeds inside pomegranates, but was unable to explain the flakes’ hexagonal form. Somewhat later René Descartes discerned that branches sprout off each side of the stems of hexagonal snowflakes at an angle of 60 degrees, with an angle of 120 degrees thus separating the branches themselves. The process is complex, but the hexagonal shape of snowflakes essentially reflects the underlying atomic structure of water. One suspects that even the skeptic Descartes would have offered up a *Te Deum* had he known that the two hydrogen atoms in a molecule of water branch off the oxygen atom with about 120 degrees of separation.

For all the scientific awareness of the symmetrical character of snow crystals, the ubiquity of their popular image—the one we see in children’s paper cutouts and on bags of ice and signs for motels that have air-conditioning—is a relatively recent phenomenon. What snowflakes actually looked like was not widely known until the middle of the nineteenth century, when the book *Cloud Crystals*, with sketches by “A Lady,” was published in the United States. The lady had caught snowflakes on a black surface and then observed them with a magnifying glass. In 1885 Wilson Alwyn (“Snowflake”) Bentley, of Jericho, Vermont, began taking photographs of snowflakes through a microscope. Thousands of Bentley’s photomicrographs were eventually collected in his book *Snow Crystals* (1931). The fact that not one of the snowflakes photographed by Bentley was identical to another is probably the basis for the idea that no two snowflakes are ever exactly the same—an idea that is in fact unverifiable.

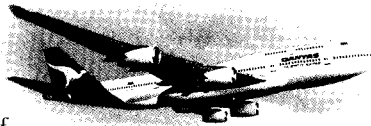
INTO THE TUBES

AESTHETICS did not drive snow science. Even as Wilson Bentley was peering through the camera bellows of his photomicrograph, Americans by the millions were continuing to settle the lands beyond the Mississippi. From 1870 to 1910 the population of California grew by 325 percent. During the same period the population of the eleven western states as a whole grew by 600 percent. The newcomers confronted firsthand a truth about the West presciently stated by the explorer and naturalist John Wesley Powell: “In the whole region, land as mere land is of no value. What is really valuable is the water privilege.” Unlike water in the East, water in the West could not be taken for granted; rainfall was in many places nonexistent or seasonal. It was no secret that the snow that fell in wintertime turned into most of the water that appeared in spring—albeit unpredictably in terms of volume and timing. What if some element of predictability was possible? Imagine the consequences for the building and management of reservoirs, the



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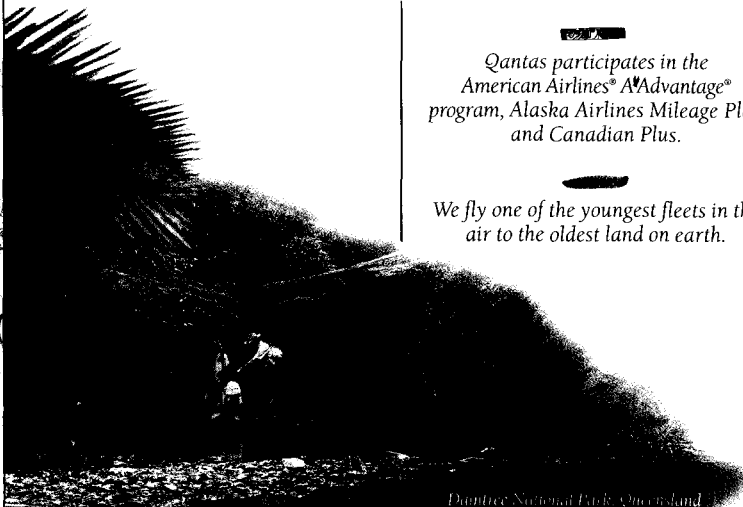


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control of flooding, the rational allocation of water among various kinds of users.

Riverine data in some form have been collected by all civilizations, so essential are rivers to commerce and agriculture. Records of the annual high-water level of the Nile, for example, are complete all the way back to A.D. 622, save for one large gap in the early modern period. The U.S. government in the mid-1800s began attempting to gather reliable meteorological information on its rapidly expanding and geographically diverse domains, and by the turn of the century runoff data in the form of hydrographs existed for many of the important western rivers. It occurred to a number of investigators that if, by means of a crude model, one could correlate, year after year, the size of the snowpack at the moment of its greatest extent—the moment of what is now called “ripeness”—with the streamflow, then one would have a powerful forecasting tool. Moreover, if one measured the snowpack not only at the moment of greatest extent, which usually occurs in April, but also in March, February, and January, and kept detailed annual records, one might even be able, eventually, to make a preliminary forecast as early as midwinter, based on past trends. Of course, even if this methodology worked to perfection, it would never reveal how much snow had actually fallen or how much water that snow actually contained. It could, however, reveal that this year’s runoff had a certain probability of being, say, roughly 20 percent less than average, or 15 percent more.

That, at any rate, was the idea entertained at the turn of the century by, among others, James E. Church, an active outdoorsman who was a professor of Latin and Greek at the University of Nevada, in Reno. Church was animated in part by the situation of Lake Tahoe, which epitomized the competition for water in the West. In this case the competition involved farmers downstream, who needed the lake’s water to irrigate their crops; a hydroelectric-power company, which operated several power plants on the Truckee River, whose source is Lake Tahoe; property owners on the lake, who wanted its level to remain constant; and the Paiute Indians, who by federal treaty were guaranteed a certain amount of Tahoe water to feed their Pyramid Lake. Being able to predict snowmelt would simplify the management of the lake.

Because evaluating water content was his aim, and because the water content of snow varies widely from storm to storm and even within the context of a single “weather event,” Church contended that a simple depth measurement would probably not suffice. The old rule of thumb for snow-to-water conversion is that ten inches of “average” newly fallen snow make for about one inch of water, but some snow is much wetter and some is much drier. In Colorado, famous among skiers for its powder, twenty inches of snow or more may be needed to produce one inch of water. The samples that Church required in order to create a

historical index had to reflect the water content, the “snow-water equivalent.” Church therefore employed a stainless-steel cylinder, which he forced through the snow to extract samples from the surface of the snow to the ground. Once obtained, the samples would be weighed, weight being a reliable index of water content. Church’s extraction instrument, which was more than six feet long, and onto which extensions could be screwed, came to be known as the Mount Rose sampler, after the mountain where he conducted his first surveys. Subsequent models have been waxed, polished, baked with silicon, and provided with teeth, and



the stainless steel has given way to aluminum, but their design remains based on the original.

By 1911 Church and a U.S. Weather Bureau official named J. Cecil Alter were independently making systematic snow surveys, Church around Tahoe and Alter in the watershed around Great Salt Lake. They each developed the idea of the "snow course"—a series of sampling sites strung across a short distance, in order to reduce distortions caused by wind and drift. The very same sites, identified by tall markers, would be surveyed year after year, to ensure that the data were truly comparable. The surveyors' efforts were fo-

cused on the higher elevations, where there were no meteorological stations of any kind, and where, from the moment of first snowfall to the onset of spring thaw, the snowpack is less apt to melt: it is a more or less steadily accumulating resource. The altitude, though, brought problems of accessibility. Church and Alter and those who came after them had to trudge up to the snow courses on snowshoes and skis. There were blizzards to contend with. There were avalanches, and in the spring there were bears. I asked one veteran snow surveyor, Douglas Powell—a man who, as a graduate student, knew James Church, and who esti-



Paul Leith

mates that he has spent 1,600 days of his life in the high country on skis—if “grueling” was a word that accurately described the servicing of a snow course. He said no, the word he would use was “demanding,” and he went on to tell about how once, in 1969, when he was conducting a survey in the Sierra Nevada, it snowed 150 inches in two days. Powell said, “All right, *maybe* grueling.”

LAWS UNTO THEMSELVES

AS the idea of snow surveys caught on, promoted first by private interests and universities, then by state governments, and ultimately by the federal government, with James Church playing the proselytizing role of Saint Paul, snow courses began to spread throughout the western mountains. With them came a modest support structure. Photographs from the 1930s and 1940s show the log cabins built to sustain snow surveyors on weeklong treks through alpine country; many of the cabins were topped by a wooden tower twenty or thirty feet high—the “Santa Claus chimney.” In late winter the snow would often be so high that only a door at the top of the chimney offered access to the snug safety of the cabin deep below. Besides physical comfort there was

the comfort offered by a professional guild: the Western Snow Conference was established in 1933. (An Eastern Snow Conference was established several years later; its focus is somewhat less on snow as a resource, somewhat more on snow as a nuisance.)

Snow courses proliferated in the West—there were about a thousand of them by 1940—because the data they provided and the models they made possible proved useful. The models were not subtle. They were at first based solely on the amount of snow on the ground, with the data being used in an equation that was found, through trial and error, to produce a semi-satisfactory result. It was not long, however, before hydrologists realized that every basin, every watershed, worked in a different way. George D. Clyde, a Utah governor and one of the great names in American hydrology, put it this way: “Each watershed seems to be a law unto itself.” Patterns of precipitation in the mountains of the Northwest turned out to be vastly different from those in the mountains of the Southwest. The assumption that the depth of the alpine snowpack greatly exceeded that of the snowpack at lower elevations proved to be correct in most places, but often not in Arizona or California. In Nevada the relationship was sometimes turned on its head: it all depended on whether storms tended

T V

All the preachers claiming it was Satan—
And now the first sets seem more venerable
Than Abraham or Williamsburg
Or the avant-garde, but then nothing,

Not even the bomb, had ever looked so new,
So it seemed almost heretical watching it
When we visited relatives in the city,
Secretly delighting, but saying later,

After church, probably it would not last,
It would destroy things: the standards,
And the sacredness of words in books.
So it was well into the age of color,

And Korea and Little Rock long past,
Before anyone got one, and then some
Of them in the next valley had one,
And you would know them by their lights

Burning late at night, and the recentness
And distance of events entering their talk,
But not one in our valley; for a long time
No one had one, so when the first one

Arrived in the van from the furniture store
And the men had set the box on the lawn,
At first we stood back from it, circling it
As they raised the antenna and staked in

The guy wires before taking it in the door,
And I seem to recall a kind of blue light
Flickering from inside and then a woman
Calling out that they had got it tuned in—

A little fuzzy, a ghost picture, but something
That would stay with us, the way we hurried
Down the dirt road, the stars, the silence,
Then everyone disappearing into the houses.

—RODNEY JONES

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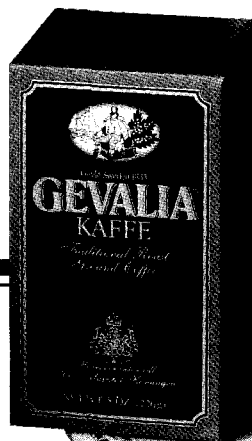
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Check Coffeemaker color: ☐ White (WH) ☐ Black (BL)

Check One: ☐ Whole Bean (1) ☐ Ground (2)

Check One: A ☐ One lb. Traditional Roast Regular
B ☐ One lb. Traditional Roast Decaffeinated
C ☐ 1/2 lb. Traditional Roast Regular & 1/2 lb. Decaffeinated

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Card Number: _____ Exp. Date: _____
☐ Enclosed is my check payable to Gevalia Kaffe for \$10.00.

Please sign here

CODE: 006-944728

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Address _____

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Area Code

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to come in low or high, and on what stood in their way.

New variables had to be added. One of the first was soil moisture at the time of the first snow. If the weather had been unusually dry, much of the spring snowmelt would drain into the ground, and would not immediately show up in stream-flow; unexpected shortages would occur. If it had been unusually wet, not only would most of the water in the snow cover run off but the increased contribution from water in the soil might build streamflows of a size no one had anticipated. Other factors, too, needed to be considered—elevation, wind speed, air temperature, radiation, slope of terrain, extent of snow cover, extent of tree cover, spring precipitation. As these were gradually incorporated into models, the models began to look more and more like something that aspired to show conceptually how the natural world really worked.

That process would take decades—indeed, is still going on, the state of the art currently being represented by the National Weather Service's powerful and intricate River Forecast System model. Even in their primitive state, though, snow-water forecasts were valuable. They could certainly warn of impending extremes—vast oversupply and vast undersupply. The record over the years buoyed confidence in reliability, and water commissioners took heed. Bankers reviewed the forecasts before deciding how much credit to extend to farmers. Farmers adjusted their acreage accordingly. In Utah the 1934 spring forecast by George D. Clyde indicated that streamflows in the state would run at 25 to 50 percent of normal; farmers scaled back their planting and ranchers moved their cattle to less arid grazing lands out of state, averting disaster in what would be remembered in other states as the year that brought on the Dust Bowl.

It was largely owing to the experience of 1934 that the federal government began to support and coordinate snow-survey work in the western states, and to conduct snow surveys of its own—a role the Soil Conservation Service took on in 1939 and retains to this day. The Depression era also wit-

nessed a vast amount of spending on dams, reservoirs, irrigation canals—public works that harnessed the annual snowmelt but made forecasts of its volume all the more important. People in the eastern United States and even many in the West don't necessarily appreciate the intricate web of snowmelt-filled waterworks that makes the western United States possible. The Colorado River alone today feeds 1,470 reservoirs.

Will infrastructure-building and management of the interior ever again seem as heroic and progressive as they did during the 1930s? *Life* magazine, the television of its time, sent photographers to record snow surveyors on the job, following R. A. ("Arch") Work, one of the founding fathers of the SCS system, and a ranger named Jack Frost (!) as they trekked from course to course high in the Cascades. Looking back wistfully on this period, the author of one engineering textbook calls it "the First Golden Age of Hydrology."





Paul Luth

BETTER DATA, BETTER MODELS

I SAT down for an hour at the Snow Conference meeting with Eugene L. Peck, who is the president of a hydrological engineering firm called Hydex, and who for more than three decades was on the hydrological staff of the National Weather Service; his career there culminated with the directorship of the Hydrologic Research Laboratory. When I asked him how deep his roots went in American hydrology, he replied, "I had breakfast with J. E. Church at the meeting of the Western Snow Conference in 1950." The National Weather Service and the Soil Conservation Service, which collect snow data in different ways and cooperate on streamflow forecasts, had numerous disputes in decades past over issues of procedure and turf. Peck, who spent almost

all of his career doing the basic work of hydrology in the western states—collecting data, improving models, mapping, forecasting—seems to remember them all. He may even have started a few.

I had asked Peck if he could give me a capsule history of snow forecasting in America, and he arrived with several pieces of yellow legal paper, a chronology sketched out from memory. The entries began with "1907–1910—J. Cecil Alter using stove pipe for cutter, Mill Creek nr SLC, UT" and went through "1950s—Competition between SCS & NWS, many problems but made for better forecasts," up through "1969–78—Development of airborne gamma radiation to measure water equivalent of snow cover," and kept on going.

Later Peck showed me a few items of historical interest: a half dozen delicate photographic negatives on glass, depicting snow-survey stations at Wagon Wheel Gap, in Colorado, during the 1920s; a sere and brittle copy of Volume 1, Number 1 (1920) of the *Bulletin of the American Meteorological Society*; a copy, preserved in a plastic sleeve, of a blue-bound pamphlet titled *Snow Surveying: USDA Miscellaneous Publication No. 380* (1940), which was the first official manual for snow surveyors; and, typed on translucent onionskin paper, corrected by hand, the text of a lecture by J. Cecil Alter, "Read before the Utah Academy of Sciences, Salt Lake City, Utah, Saturday, April 3, 1926." I picked up the last of these items with a certain reverence. I felt as if I were touching one of the Dead Sea Scrolls of hydrology.

Peck, though, is no antiquarian. He is involved in, among other things, NASA's BOREAS project, which is an ambitious attempt to create a meteorological and hydrological portrait of large parts of Canada—a portion of the continent whose freshwater resources in the form of snowmelt go largely uncaptured. In our conversations about snow and the water it contains Peck kept coming back to one basic point: that snowmelt forecasting still depends on having some sort of data and some sort of model to plug the data into. The story of forecasting, then, is the story of a search for better data and better models.

There has from the beginning been a school, for example, that held that data gathered from precipitation gauges—open buckets, basically—could be used to predict streamflow as reliably as data from snow surveys done with snow tubes. Snow-tube surveys did have obvious disadvantages. As noted, they were arduous. They were labor-intensive and therefore costly. And frequently snow courses were sited in areas that, for one reason or another, proved unrepresentative of the actual snowpack. Precipitation gauges were easier to get to—they tended to be at lower elevations—and could even be automated. They could provide information about rain as well as snow. But precipitation gauges had drawbacks too. Even when they were equipped with shields, for example, high winds would impel much snow laterally

across the orifice, in a process called eddying. The result was “undercatch”: the gauges would underreport the volume of snow.

Precipitation gauges, too, can be sited in unrepresentative areas, a problem occasionally abetted by human agency. Peck told the story of the weather station in Shoshone, Colorado, whose precipitation-gauge data had been so erratic and variable that Peck, who at the time was the head of the National Weather Service’s water-supply forecast unit, in Salt Lake City, decided to visit the place and talk to the man who had run it for years and years. “I found the can,” Peck said. “It was hooked onto a metal stairway where the snow could slide into it off the roof. But precip couldn’t get in there, it was up so close to the building. So I said to the old guy, ‘Well, how long’s it been there?’ And he said, ‘Actually, quite a while. You know, originally it was out by the highway, in the thirties.’ And I said, ‘What happened?’ And he said, ‘Everything went fine—it really was a good place—except when the snowblowers on the highway began blowing snow over it and it started filling up. So we decided to move it. We moved it behind the station, but the tree grew up and was covering it. So we moved it up by the school ground. But that didn’t work too well, because we started getting precipitation when there was no precipitation. Kids were using it for a urinal.’”

Beginning in the 1960s, Peck went on, forecasters began experimenting with a device called a snow pillow. A snow pillow looks like a very large ravioli made of neoprene rubber or pliable metal. It is a square, perhaps six to ten feet on a side, and is filled with antifreeze. As snow falls and the snow-pack gets heavier, the pillow is compressed; the degree of compression, reflecting the weight of the water above, is communicated by radio to a monitoring station. One great advantage of snow pillows is that they can be placed securely in remote locations, where they will transmit data throughout the winter. But they are prey to a variety of ailments. One is called “bridging”: periods of thaw or rain followed by a freeze can result in the creation of a reinforced support layer or even a static frozen dome over the pillow, which effectively tricks it into thinking that no further accumulation has occurred when it has.

My conversation with Peck was suspended when a lecture began on the subject of the algae that live in snow and feed on the nutrients in it. The organic material the algae excrete may support colonies of bacteria, and the algae themselves serve as food for several varieties of snowworms. Sometimes algae are so prevalent that the snow turns red or yellow or blue; the colored snow may exude the smell of fresh watermelon. The lecture revealed one more novel element in the unfolding dynamic of snow—the fact that snow is an ecosystem. By the time the lecture began, Peck had gotten as far on his sheets of legal paper as “1979—Thomas Carroll to direct operational program in Minneapolis, MN.” He was, it seemed clear, just getting going.

THE STRATEGIC SNOW COMMAND

THERE is a certain cast to the people who attend meetings of the Western Snow Conference. It is not, of course, exhibited universally, though I suspect that it would clearly emerge if one were somehow to add everyone together and take the mean. They are mostly men and mostly at the lower end of middle age. They seem to be independent-minded, friendly, physically fit. They are given to calling precipitation “precip,” and partial to neatly trimmed facial hair and the kind of casual clothing one associates with people who do enlightened and brainy things outdoors. Formality never exceeds a bolo tie, the color of whose string indicates regional affiliation. The design of the clasp tends to reflect the year of one’s first attendance at the Snow Conference; there were clasps around me going back to the 1940s.

One senses that there may be something of a division inside the Western Snow Conference between a younger generation that holds a firm faith in what new technology can accomplish and an older generation that idealizes tramping about in snowshoes with a Mount Rose sampler. Even so, the nature of the work brings out a bit of the mountain man in almost everyone. I cautioned one hydrologist, who was about to make the harrowing drive up the mesa to nearby Los Alamos, “Hold on to your hat. It’s pretty steep.” He looked at me as if to say, “I could do steep in my sleep.”

No one intends to give up the traditional manual outdoor snow surveys. Not only are they part of the romance that drew many people into the field to begin with, but, more important, they contribute an indispensable something for which, in this age of remote sensing, a specialized term has been developed: “ground truth.” With respect to the specific variable of water content, snow surveys set a standard that other methods can only measure themselves against. Many of James Church’s original snow-survey courses in the Sierra Nevada are loyally maintained to this day.

Still, the forecasting business has made some important advances during the past few decades (a period known to some as the Second Golden Age of Hydrology). In addition to the 1,600 or so traditional mountain snow courses that the Soil Conservation Service and other agencies continue to run, the SCS operates 550 SNOTEL (for “snow telemetry”) sites in mountainous areas throughout the West, each with an array of snow pillows, precipitation gauges, and sensors to record temperature and sometimes other variables, such as wind speed and soil moisture. Information is brought back to headquarters by means of “meteor-burst transmission”: a request signal from one of the two SNOTEL master stations is bounced to remote sites not off a satellite but off the ionized trails of some of the billions of tiny meteors that enter the earth’s atmosphere every day; the remote stations bounce back their most recent data in the same way. Forecasting agencies still send out on paper monthly state-by-state bul-

Imagine A

AND A COUPLE

TO GET TOGETHER

AND THE SWED

ABOUT SAFETY

TALK ABOUT

YOU SUPPOSE

dinner.

happen

1. The first part of the document is a list of the names of the persons who were present at the meeting. The names are listed in alphabetical order. The names are: [illegible]



letins, but increasingly all the relevant data is available electronically, often in real time or near-real time.

Actually, the term "data" is beginning to sound a little limited. The National Weather Service in its publications refers to what it inclusively calls "airborne and satellite snow-cover products." I spoke with Thomas Carroll, who was the chairman of the executive committee of the Santa Fe meeting, and who since 1979 has been the director of the weather service's National Operational Hydrologic Remote Sensing Center, which is based in Minneapolis. For much of North America the center functions as a kind of Strategic Snow Command. The NWS, Carroll said, runs snow courses after a fashion—more than 1,850 of them, in twenty-six states and seven Canadian provinces. Each one is about ten miles long and is monitored by aircraft. The basic idea behind these very long snow courses is relatively simple. The earth's surface emits natural gamma radiation from trace elements of potassium, uranium, and thorium in the soil. That radiation is attenuated by the amount of water in the snow. An estimate of water content can be obtained along any of the established flight lines by comparing a background reading previously made over bare ground with a fresh reading made over the same piece of ground under snow.

There are limitations. "All methodologies have deficiencies," Carroll said, and he frankly ticked off the ones that characterize his flight-line network. "One, we have to fly close to the ground—five hundred feet—so we can only fly in good weather. Two, flying close to the ground means that terrain is also a problem. We can do some mountain areas, but we can't do others. Three, when the snowpack gets above eight, ten, twelve feet, the gamma-radiation technique turns to mush. The biggest limitation of all is the cost. It takes a lot of money to fly airplanes."

The snow-water-equivalent estimates from overflights, like those derived from any snow course, represent only samples. But already it is possible to merge, using computer models, sample surveys of every kind with

continent-wide snow-cover imaging obtained by microwaves from satellites. The images will be getting better. Last October the space shuttle *Endeavour* made its second series of experimental investigations (the first was in April) with a new radar system capable of looking at the snowpack. A powerful multipurpose remote-sensing platform called the Earth Observing System, consisting of several integrated satellites, is scheduled to go into operation in 1998, with a \$7

billion array of earth-monitoring equipment that will make the present Landsat satellite seem like a stereoscope in a Victorian parlor.

As we discussed satellites, Tom Carroll repeated, "All methodologies have deficiencies." The advantage of microwaves, Carroll said, is that they can see through clouds. The disadvantage is that they can show with confidence only the areal extent of the snowpack. They are much less able, given the present state of technology, to extract accurate information about water content. "That's a big problem," Carroll said. "Big problem." Even so, he went on, just being able to see the areal extent of the snow cover can make an important difference. Consider what happened in 1983 in the Colorado River basin. Forecasters knew from

sampling that the water content of the snowpack was running about 200 percent of normal—"There was a lot of snow all over the shop"—and were expecting much more than the usual runoff. Typically what happens in the West is that the lower elevations warm up before the higher elevations, and the runoff is therefore gradual, drawn out over time: what is known as a "soft landing." In 1983 there was very little early-spring runoff. Scattered local reports indicated that the lower snowpack was still in place, but no one had any idea of the vast size of the phenomenon. The weather stayed cold all through the spring, and then a weather system moved in and warmed the entire snowpack all at once. *Big problem.*

**The snowmelt that
finds its way
into the Columbia
River alone in
an average year
could cover all of
Kansas knee-deep in
water, or raise
Lake Michigan by
almost six feet.**



"If we'd had a program then to monitor areal extent of snow cover," Carroll said, "we'd have noticed the anomalies in the lower elevations. We could have been more responsive."

Being "responsive" in this case would have meant releasing water from reservoirs downstream to accommodate the coming torrent. As it was, in 1983 the Colorado River spilled over the top of the Hoover Dam, creating a western version of Niagara Falls. Flooding in the Colorado basin did not end until autumn. Looking back at newspaper accounts, I noted with satisfaction that the federal official charged with overseeing the Colorado River dams was named Plummer.

THE FUTURE OF SNOW

FOR all the improvements in detection, though, there remains something fundamentally unsatisfying about the forecasting endeavor. One hydrologist I met at the Snow Conference meeting resorted to a medical analogy. We have gone, he said, from the equivalent of Laënnec's wooden tube to the stethoscope to the electrocardiogram in the space of a generation, but, as with the human body, we still don't know many fundamental things about snow. Nor do we understand its relation to weather and to climate—the dynamics of climate being one of the perennials on the "must figure out" list of science. And although, as in medicine, we can predict the likely course and consequence of certain conditions once they arrive, we find it a lot harder to predict the onset of many of those conditions very far in advance.

That is one of the tasks for the future. The Snow Conference meeting offered glimpses of some avenues of research. One paper speculated about a possible relationship between the size of the Himalayan snowpack in a given year and the size and timing of the subsequent monsoon. Another paper sought to document a link between the periodic El Niño warming trend and diminished snowfall in the Pacific Northwest, a link that would have practical significance for forecasters if the onset of El Niño could consistently be determined in advance. (I overheard someone behind me snort and say, "Yeah, but try telling water-conservation officials that you think there's going to be a shortage because of the barometric pressure in Tahiti.") Several papers looked ahead to what would probably happen to precipitation and snowmelt in certain locales in the event of global warming. One of them, which assumed a 3°C increase in average temperature, concluded that the volume of precipitation in the Sierra Nevada would not be much affected but the timing of the snowmelt would: nearly a third of the precipitation that would ordinarily appear as runoff in springtime, when farmers can use it right away, would appear as runoff in wintertime instead, meaning significant losses for watersheds that don't have adequate means of storage.

Even as global climate and large-scale circulation patterns affect snowfall, snowfall has a considerable impact in return, given that gains and losses of energy in the atmosphere are what swirl air masses around the planet. There is no natural

surface on earth with a higher albedo—reflective power—than fresh snow. A field of planted farmland may reflect back as little as three percent of shortwave solar radiation. The Mojave Desert may reflect as much as 30 percent, sea ice as much as 40 percent. Fresh snow may reflect fully 95 percent. Rather than being retained as heat, the sun's energy is sent back where it came from. The melting of a winter's worth of snow takes so much energy that even though the sun in the Northern Hemisphere is at its most intense in June, the atmosphere remains cooler than it "ought" to be until August.

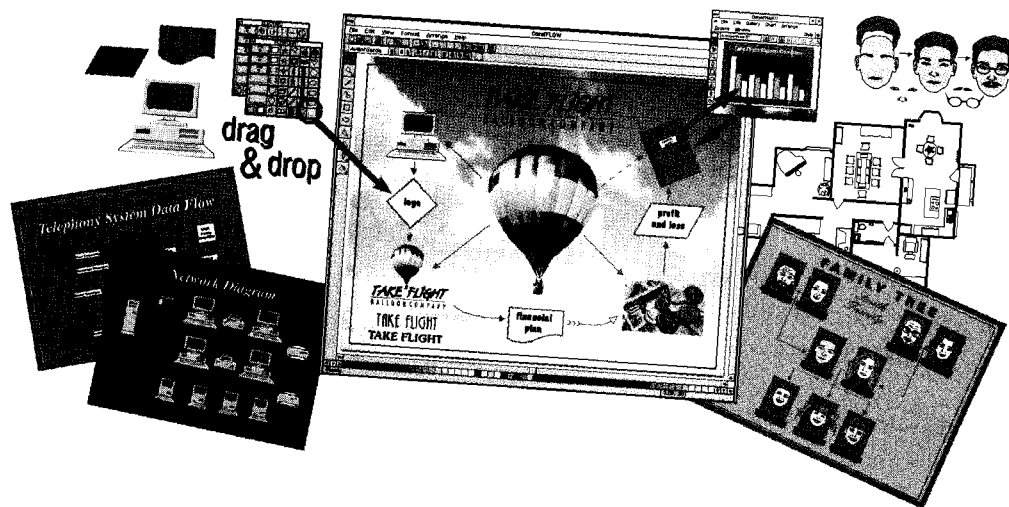
All the earth sciences began as applied sciences, spurred by basic considerations of economics and survival. In helping to organize the Western Snow Conference, James E. Church expressed the hope that the study of snow might be broadened beyond the pragmatic and the empirical. To some extent this is happening. Snow studies are, of course, still pragmatic, sometimes in ways that those in the so-called progressive conservation movement of the late nineteenth and early twentieth centuries would never have anticipated. In the current period of drought, for instance, utility companies and water authorities are conducting cloud-seeding experiments in many areas of the West as part of an attempt to see if more snow can be put on the peaks. (Such efforts in the past resulted in some well-publicized legal tangles when snow suddenly fell in an unexpected place.) Snowmelt forecasting will also play a big role as states throughout the West, under various mandates, begin to restore depleted rivers and lakes. To the list of competing uses for the snowpack's water, in other words, we must now add another.

AS I prepared to leave Santa Fe, the space shuttle *Endeavour* was high overhead, in the midst of a successful ten-day test of its new radar. I drove north out of town to the banks of the Rio Grande, which flows through a broad plain between the Jemez and the Sangre de Cristo mountains. The snow in the lower elevations had begun to melt, and the river, though it was still shallow and slow-moving, had begun to rise. According to the newspaper that morning, the Sangre de Cristo Water Company's reservoirs in the Santa Fe Canyon, which trap the spring snowmelt and were now nearly full, would be releasing water into the Rio Grande in a matter of weeks. Looking up, I could see the alpine snowpack—still intact, and, on average, about ten feet deep, according to information I had received from the Soil Conservation Service. Or, as I might have put it at another time, "The snow 120." The cottonwoods along the Rio Grande displayed the haze of fuzzy lime-green they briefly exhibit every spring, reminding me that this was exactly the time of year that Horace had been writing about: "The snows have dispersed, now grass returns to the fields and leaves to the trees."

All those former needles and sheaths, those cups and bullets, those dendrites and stellar crystals—they were dispersed, or dispersing, to be sure. But, fortunately for all of us, they would be back. ☼

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Resurrection

by HA JIN

“You understand the Party’s policy,” his interrogator said,
“so I won’t waste my breath explaining it. Your attitude toward your crime will determine how we handle your case.”

AMN you,” Fulan said to her husband, Lu Han. “Now the whole Ox Village knows you slept with my sister. How can I go out and meet their faces?”

Lu was sucking at a pipe in silence. The wrinkles on his forehead stretched to his temples, and his small eyes were lusterless. He was not yet thirty, but he had changed so much recently that he looked like a man in his fifties. Fulan took their four-month-old boy off her large breast, turned him around, and thrust her other nipple into his mouth. She said, “Shame on you. Can’t take care of your own cock. Even a studhorse knows not to mount his sister. Shameless—why don’t you go out, find a tree, and hang yourself?”

Lu wanted to jump up and yell, “Your sister’s no good either, a cracked melon already! If a bitch doesn’t raise her tail, no dog can do anything to her.” But he remained on the bench, motionless, biting his lips.

She started again: “All right, you play deaf if you like. Tomorrow I’ll go back to my parents with Leopard. If your face is thick enough, you come and fetch us. My dad and brothers will skin you alive.”

Lu stood up and walked out into the dusk. He knew that talking was useless; once she got an idea into her head, he could never bring her around. Besides, what could he say? He was in the wrong to have slept with Fuli when his wife was pregnant. He felt so ashamed that he had cursed himself many times, but what was done was done, and all he could do now was bear the consequences.





The peanut plants rustled in a lazy breeze. Katydid was chirping tremulously as the night air brought its coolness. Lu sat down by a millstone under a large mulberry. His broad shoulders drooped, and his short legs ached. He gave out a long sigh and muttered to himself, "You asked for it."

He began thinking about how to atone for his error and start his life anew. The day before, the village Party secretary, Zhao Mingyi, had told him to prepare to make a clean breast of his offense. He was supposed to go to the production brigade's office the next evening and face interrogation by the brigade leaders. He was not afraid of their scolding, because he was certain he could keep quiet and endure their scathing words. What worried him was that if they were not satisfied with his confession and self-criticism, they could have him denounced publicly or paraded as a corrupt element through the streets. If that happened, his family and he himself would be done for. He had to be careful not to offend those leaders. For the time being, he thought, let Fulan do whatever she wants. He should deal with the external crisis first. Only after settling that could he put his family in order again.

The next morning, after breakfast, Fulan was ready to leave with their baby for Date Village, where her parents lived. She was to ride in a horse cart, which was going there to carry back peanut cakes for the brigade's chicken farm. Before she got on the cart, Lu gave the driver, Chu, a packet of Rose cigarettes and asked him to take care of his wife and son on the way. Chu smelled the cigarettes and promised with a grin, "They'll get there without losing a hair."

After they left, Lu went directly to the soybean field on the southern hill and joined the commune members in hoeing.

He didn't cook lunch for himself at noon; instead he ate two cold corn cakes and radishes with soy paste. After feeding the poultry and the sow and the piglets, he went back to the field. For a whole day he smoked continually, musing over the impending trial. How lucky it was that his parents were dead. If they had been alive, the shame he brought on them could have killed them. How lucky he was that the leaders hadn't caught Fuli, or they would have interrogated her to see whether everything he told them was true. She had left for her aunt's home in Heilongjiang Province a month before the scandal became public. On the northern frontier every woman was considered marriageable, because men outnumbered women. Two brothers would even share one wife. Lu had heard that Fuli became engaged to a middle-aged veteran soon after she arrived there.

At seven in the evening Lu reached the brigade's office. The door was open, and inside the room a radio was playing a song, "I See the Pole Star When I Look Up." Lu stepped in, but dared not go farther; he stood by the door waiting for instructions. Secretary Zhao; the brigade director, Wang Peng; and Scribe Hsiao sat at a table smoking cigarettes and drinking tea. Zhao motioned to Lu to sit in front of them. The scribe turned off the radio. The room grew quiet, but

one could hear in the air a droning sound made by a few flies. Lu was reminded of lines from a poem by Chairman Mao: "On our small planet / A few flies bang on walls / Buzzing, moaning, sobbing."

The trial started. Zhao pointed at a scroll hung on the wall beneath the Chairman's portrait, and ordered, "Read these words for us."

"Leniency Toward Those Who Confess; Severity to Those Who Refuse!" Lu read in a shaky voice.

"Good," Zhao resumed, "you understand the Party's policy, so I won't waste my breath explaining it to you. Your attitude toward your crime will determine how we handle your case."

Lu was struck by the word "crime." Is adultery a crime? he asked himself. It must be. Then they can treat me as a criminal, a class enemy! Sweat broke out on his forehead. The thought occurred to him that he ought to appear more remorseful.

"Tell us, when did you start the abnormal relationship with Lin Fuli?" Wang asked.

"Last fall," Lu said.

Scribe Hsiao dipped a pen into an inkstand and started taking notes.

"How many times did you two have sexual intercourse?"

"I can't tell exactly."

"Think hard." Wang's eyes drilled into Lu's face and made him shudder a little. "Tell me, how many times?"

"Probably twenty."

"How many times did you go to bed together?"

"Mmm—once."

"Why only once?"

"Because my wife was home all the time. She went to town to sell chickens that day, so we two slept together on the warm bed."

"What day was that?"

"I can't remember exactly. It was last winter."

"Your wife was carrying your baby at that time?"

"Yes."

"Shame on you!" Wang thumped the table. "Your woman was big with your child and went to town selling chickens for you, while you were screwing her sister at home. What kind of a man do you think you are?"

"I'm sorry." Lu hung his head low.

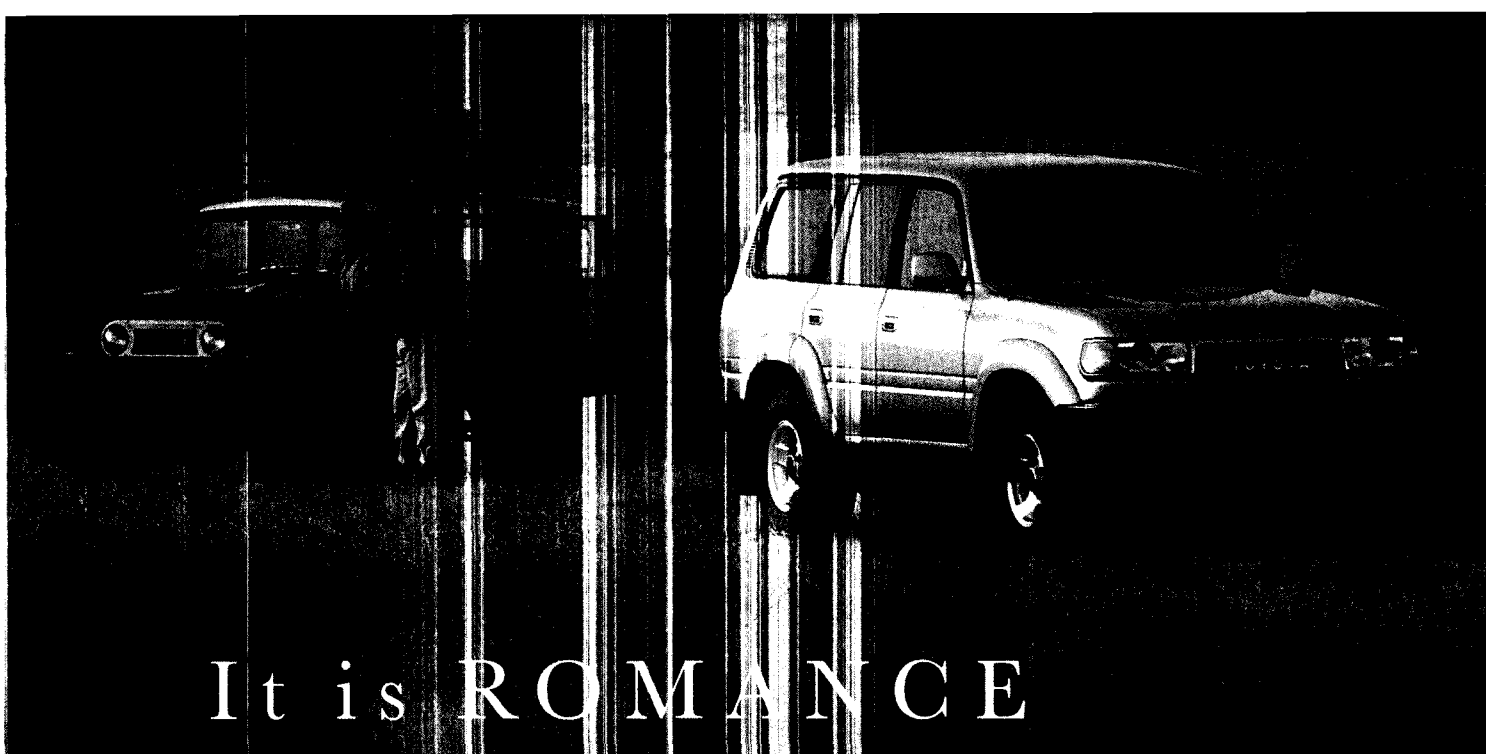
"Sorry, too late," Wang shouted. Then he moved his head closer to Lu and asked in a soft voice, "Why did you do that?"

"I don't know. Couldn't contain myself."

Secretary Zhao broke in: "No, it's not a problem of self-control. You have too many bourgeois thoughts in your brain. Though you're a descendant of a poor peasant, those thoughts have corrupted your mind and driven you to commit the crime."

"Yes, that's true," Lu admitted.

"Tell us why you had sex with both your wife and her sister," Wang resumed. "What's the difference between them?"



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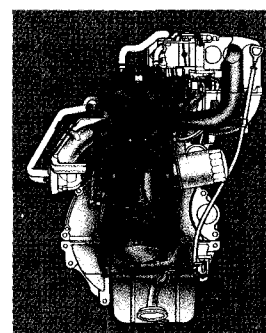
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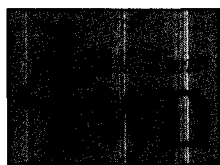
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Aren't they dishes from the same pot?" Wang's baggy eyes searched Lu's face.

"Don't know. I can't tell the difference." Lu was bewildered by the question, but he told the truth. He had never thought of differences between the two women.

"All right, let's come back to the first time. Where did it happen?" Wang asked.

"In the sorghum field by the reservoir."

"Talk more about it. Describe how you two met there, who started it, what you said to each other, how you did everything there. From the beginning to the end."

"I've forgotten the details."

"Lu Han," Secretary Zhao said in a serious voice, "you've been trying to evade the questions. I hope you understand that this attitude will put you in an awkward situation, which will require us to take necessary measures."

"Yes, I do, I do."

"Tell us everything, then," Wang went on. "Who can believe you forgot the first time?"

Lu began weeping. "I don't remember clearly."

"All right, tell me who opened pants first."

"Mmm—, she o-opened mine."

"See, you remember it well. Then what did she do?"

"She, she—"

"Don't mince your words."

"She took me into her mouth."

The secretary, the director, and the scribe all chuckled but immediately became solemn again. Lu kept his head low and dared not look at them.

"What did she say?" Wang asked.

"I can't recall."

"We're sure you remember. You refuse to tell us, don't you?"

"No, I don't."

"Tell us, then."

"She said, said—"

"Said what?"

"She said, 'I love this—this chunk of flesh best.'"

They burst out laughing. Lu shuddered, his face covered with sweat. A cold tingle ran down his spine. He knew he had said too much. The villagers would soon know what he had said, and other villages would hear of those words as well; his in-laws, too humiliated, would chop him to pieces.

"Tell us, did your wife ever do that to you?" Wang asked.

"No." Lu shook his head.

"See, that's the difference. Just now I asked you why you

ate two dishes from the same pot. You said you don't know. You're dishonest, lying to us. How can you receive any clemency?"

Lu wiped the tears and sweat off his face. He hated himself for having incurred such a misfortune—his family was broken, and he could easily become a reactionary element. Every-

thing had happened because he hadn't been able to control his penis and had never thought of the consequences. Why couldn't he wait until his wife gave birth to the child? His woman was much prettier than her sister. It served him right. However hungry, he shouldn't have taken food indiscriminately.

Secretary Zhao whispered in Wang's ear. They apparently had to go somewhere for a meeting or a party. Wang nodded and then turned to Lu. "We stop here for today. This is just a beginning, and you haven't shown us a sincere attitude yet. You go

home and write out your confession. Describe every meeting with her to the smallest detail. Don't leave out anything on purpose. We can tell where you play a shoddy trick. Is that clear?"

Lu looked at Wang and then at Zhao. His face contracted nervously and produced a false smile.

"We know you can write," Secretary Zhao said. "You're one of the few middle school graduates in our Ox Village. If you can't write, nobody can."

"Yes, that's why you always carry that thing," Wang said, pointing at the Gold Dragon fountain pen stuck in Lu's breast pocket. Then he turned to the scribe and ordered, "Young Hsiao, give him stationery."

Hsiao came over and put before Lu five pads of letter paper, two bottles of blue ink, three brand-new penholders, and a small box of nibs. "All are yours," Hsiao said.

Lu took the stationery, stood up, and made a bow. He put on his cap and turned to the door.

OR two days Lu worked on the first page of his confession. Indeed, he had written well in middle school and even won a prize for an essay on the advantages of planting trees, but he had never tried this sort of writing. In addition, he was uncertain what he should put into the confession. Whatever he wrote on paper would be kept in his file and could be used against him in the future. Moreover, those leaders would surely pass the writing around, and the whole village would read it. Some people already knew what he had said two days before. This morning, while he was



near the village entrance cutting grass for the geese, Chu had driven the horse cart by, cracking his long whip and chanting, "I like this chunk of flesh best! I like this chunk of flesh best!" How he hated Chu. How he wanted to grab that whip, flog him to the ground, and thrash all the breath out of him. He regretted giving Chu a packet of cigarettes worth twenty-three fen.

No, he must not say anything like that again. It was a matter of life and death. He envisioned his four brothers-in-law, led by their father, brandishing scythes and spades in search of him. Even the two screaming sisters-in-law wanted to scratch and bite him. From now on, every word he said had to be carefully thought out.

On the other hand, if he didn't satisfy the leaders, they could handle his case in whatever way they liked. They could punish him as a criminal, to warn those who dared to disobey them. Or, at least, they could assign him an extra amount of work every day in the name of reforming him through labor. However well he wrote, he could never please both his in-laws and the leaders.

Full of remorse, he again cursed himself and regretted having the affair with Fuli. Life was so miserable. He had done himself in without second thoughts. If only he could have stopped lusting for women. How wise were Buddha's words: desire and lust were the source of disaster. He looked down at his crotch and cursed his penis again. The little devil always went its own way.

He was supposed to turn in the confession the next evening, but he was still on the first page. He had quoted a long passage from Chairman Mao, criticized himself with severe words, and talked about the "liberal" nature of his offense. Yet these items formed only a beginning to the confession. He had to fill out several pages at least. He was beating his brains about how to continue.

Having mused for hours, he decided to write about the day when they went to bed together. He began by explaining that he had seen his wife off with the chickens in front of the tofu plant, and that he had carried back two buckets of water from the eastern well. When he returned, Fuli was naked on the large brick bed, waiting for him. She asked him to bolt the front door, which he did. At first he felt uneasy; then he let himself go and did it with her.

He managed to draft three pages and copied them out in clean handwriting. After reading the manuscript aloud twice, he felt pretty good about it.

The next evening he took the confession to the brigade's office in hope of persuading the leaders of his sincerity. The same men waited for him. Unlike the last time, a mug of hot tea was on the desk before Lu.

After glancing through the confession, Secretary Zhao handed it to the scribe and asked him to read it out, since Director Wang was illiterate. Zhao lit a cigarette and blew out the smoke toward Lu, his narrow eyes fixed on Lu's sallow face. Lu trembled and looked away.

No sooner had Hsiao finished reading than Wang stood up and pointed at Lu's nose. "What goddamn confession is this? Screw your ancestors. Three pages full of farts! You took away five pads of good paper but returned only three pages of rubbish. Do you want to confess or not?"

"Yes, I do. S-sorry, I'm still learning how—how to write."

"Your confession does include one truthful sentence, though," Secretary Zhao put in. "Do you know what one?"

"No, I don't. Please enlighten me."

Zhao picked up a page and read it out: "When I was back with the water, I saw her lying on the bed stark naked, like a huge fresh ginseng root." He threw the page on the desk and asked, "Do you know why I say it's a good sentence?"

"No, I don't."

"Because it tells what you saw and how you felt at that very moment."

"Yes," Wang said, "Secretary Zhao's right. Write like he said. Don't cut corners."

"We give you a week for a complete confession," Zhao said deliberately.

"Go home," Wang ordered, "and recall all the twenty times. Write down all the facts and details. Make no less than a hundred pages."

Lu managed to get up, but forgot to bow before moving to the door. With his head heavy and something buzzing in his ears, like mosquitoes, he staggered out of the office.



He slept only three or four hours every night, working hard on the confession. Still, he wrote no more than five pages, and was uncertain whether they were acceptable. Of course he dared not tell them anything in detail. That would destroy his sister-in-law's life. The leaders would surely send a letter to the local Party branch in charge of the area where Fuli was now. Who would want to marry her if everybody knew of what they had done in the cornfields, in haystacks, in bushes, in pigpens, in the pump house? A detailed confession would also ruin his own family: his wife would never come back with his son. He was lucky that his firstborn was a boy, because the rule allowed nobody to have a second child. His luck was what made others jealous, particularly Director Wang, who had only a granddaughter. Because he was a leader and a Party member, Wang couldn't allow his son's wife to have another child, thus breaking the rule that everyone was eager to tamper with. Those bastards—they could never bear to see others' happiness.

Lu's eyes grew bleary from writing under an oil lamp. Though full of self-disgust, he constantly imagined different ways to get out of the trouble. He knew he could never meet the standard set by the leaders. More than a hundred pages? That was a book, and they might make many copies of it. The whole village would read it, and probably all the commune cadres, too. He was no writer and had no time to learn

to be one. Even if he were, he wouldn't dare to write such a book. But in two days he would have to hand it in; by no means could he get it ready. How, oh, how, could he find a way out of the crisis?

He thought of giving gifts to the leaders, but he wouldn't have any real money until the end of the year, when the brigade's annual account was settled. Those leaders would not accept promises. Four months remained—and no distant water could quench the fire here and now. However, one thing continually came to his mind and tickled his brain: General Chou's Shrine at Sea-Watch Cliff was said to be about to open after being in ruins for eight years. The temple had been built in memory of a local hero, Chou Wu, who a hundred years ago had led Chinese troops and civilians in burning the ships of the Japanese invaders and driving them back into the sea. In order to inspire patriotism among the Chinese, the present government had decided to restore it. Lu had heard that the temple was under repair and that monks were being recruited.

The ocean of misery has no bounds, he thought; repent and the shore is at hand. Why don't you give it a try? Good, quit the whole thing. I'll leave this mess behind and go into the mountains. For sure they won't bust the temple and drag me out. That would violate the Party's religious policy and they would get themselves into trouble. Being a monk, I'll have time to study, have food and clothes always, and have no worry about earthly affairs. I'm fed up with the farm work here. You work your ass off but get no pay if the harvest is poor. Fulan has her place to go; I, too, have somewhere to stay. I won't come back, even if she begs me on her knees. Let her learn a lesson from being a widow with a husband alive.

What if you don't like the temple? Why worry so much? If you don't like it there, you can always come back. Who'll force you to be a monk? No time to waste; you must leave as soon as possible. Hide away for a while. In a few weeks I'm sure they'll lose interest in the case. At least I'll have enough time there to figure out a new way to deal with them.

A few lines of Chairman Mao's poetry echoed in his mind: "Many things must be done in a hurry / Heaven and earth spin—time presses / Ten thousand years are too long / We must seize every hour." Yes, go. The longer the night lasts, the more nightmares will come up.

He got up, grabbed his pen, and wrote on a blank sheet of paper,

Respectable Leaders:

Having understood the gross nature of my crime, I have decided to become a monk. I love our country and am grateful to the Party, but I feel too ashamed to face anybody in the village, so I am leaving now for a temple where I can continue self-examination and self-education. I will study hard there and live a new, peaceful life. Farewell, my dear comrades.

Yours guilty,

Lu Han

P.S. Please inform my wife of my leaving, so that she can come back and take care of the house and the pigs. I really appreciate this.

He wrapped into a blanket his summer clothes and his only two packets of Great Gate cigarettes, and tied them up with a rope. With all his secret personal savings—eleven yuan—in his pocket, and the clothes bundle on his back, he went into the kitchen and drank two scoops of cold water. He returned to blow out the lamp and then walked into the dark.

The night was cool and moonlit, filled with insects' chirring and frogs' croaking. He was not afraid of wolves. What he really feared was man, to him the most vicious animal—and the most dangerous thing, because only man knew how to trap you. He ran as fast as he could and forced himself not to listen to any distinct sound. Fortunately, the temple was not far away, only nine

li from Ox Village. In twenty minutes it emerged in the distance. The glazed tiles shimmered in the moonshine, and the curved eaves stretched along the ridge of a hill and were shaded by the huge crowns of trees. On the roof the statuary lions and tigers seemed alive and ready to stand up and patrol like guarding gods. What a view, Lu thought; it must be a place where immortals visit. He hastened his steps and felt he had made a wise decision. Anyone who lived in that majestic temple would enjoy longevity and

happiness. Yes, he said to himself, go there, and forget the hubbub and turmoil at home.

At once his body became light, as if he were flapping a pair of wings through the air. Within half an hour he stood at the front entrance of the temple, striking the wooden gate and shouting, "Open the door!"

After a short while a noise came from inside. He heard someone coughing and shuffling to the entrance. Beyond the high stone wall flickered the light of an oil lamp. "Who's there?" an old man's voice asked.





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"Master," Lu said, feeling his heart in his throat, "I came to study gods with you. Please open the door and let me in."

"What do you really want in the middle of the night?"

"To be your disciple. Please open the door."

With a screech a hole six inches square was revealed in the gate, and a column of light thrust out. Lu moved closer and saw the old monk's chubby face, gray hair, and smiling eyes. He had a large wart beside his crimson nose.

"Master, I want to be your student."

"Young man," the monk said, "I do want to take a lot of students, but so far I don't have any. I've no say in this."

"Take me, please, Master. I can read and write. I can work and cook."

"Like I said, I want to, but I have no say in hiring."

"Hiring? You mean I have to be hired?"

"Yes, employed. Everybody wants to be a monk all of a sudden. It's like seeking employment. No, more than a job, it's like going to college. A new monk is a cadre of the state, with a salary of forty-three yuan a month. Besides, you have food and clothes free, and don't have to stay here at night. You can even marry a woman if you want, and have your own home in a nearby village. Not a bad deal at all. Things have changed these days. We plan to receive many tourists, and the temple will be expanded. Anyway, I wish you good luck, young man."

"Wait a minute," Lu said. He put his sinewy hand on the opening and asked, "Do you know who I should talk to?"

"Your brigade leaders. You have to be elected by the commune members, I guess, or at least recommended by the Party branch. Good luck. I hope to see you here someday." The opening was closed and the light disappeared.

WHEN he arrived home, the heavy dew of the small hours had soaked him through. His teeth were chattering as he lit the lamp with a trembling hand. To his surprise, the note was no longer on the table. Holding the lamp, he searched about but couldn't find it. Then he went into the kitchen and found the note lying on the floor. It must have been a wind that brought it here, he thought. But what if it wasn't the wind? What if those bastards have read it?

His hair stood up, and a mist rose before his eyes for a minute or two. He sat down on the bed, holding the corner of the dining table, shook his head, and sighed. He tried to collect his thoughts. Whether they've read this or not, I mustn't stay. If they know of my trip to the temple and get hold of

me, there'll be a denunciation meeting tomorrow. My crime is doubled now. There's no chance for clemency anymore. I must go—go far away.

But where can I go? Go to Uncle's home, in Green Village? No, that'll get him into trouble. How about going into the Great Emperor Mountain for a while? No, there are wolves and tigers in the forest. Too dangerous.

Then the idea of begging came to his mind. Yes, that's it. I'll go begging around. No, not "around." I'm going to big cities, to Beijing and Shanghai. They say lots of beggars have gotten rich and carry thousands of yuan in their belts; they live in hotels at night, and only during the day do they beg in the streets. Yes, I'll go to Beijing first. A wise man must read ten thousand volumes and travel ten thousand *li*. Since I'm still young, it's time to see the world and learn about our motherland and folk-

ways. In Beijing I'll see all the palaces, the museums, the historic sites, and Tiananmen Square, one of the largest in the world. It's too bad that Chairman Mao doesn't inspect Red Guards anymore, or I'd see his glorious face and his stalwart body on the gate tower as well.

How about Fulan and Leopard? I can't worry so much. They won't starve at home, will they? She can get everything from her parents. Once I have money, I'll buy her a diamond watch. She'll love it and look at it day and night with a broad smile. Then she'll forget what I've done. Money and wealth can always turn a woman's head.

"Today I feel unhappy at home, so I'm leaving for the capital," he chanted rather cheerfully. But someday I'll come back as a big official, whip every one of those leaders, and make them all kneel on the ground begging me for mercy. I'll forgive none of them and have them all beheaded, even though they want to pay me a large ransom.

He thought of writing a short letter, but he changed his mind and placed the lamp on the old note. Let them go to the temple to get me, he said to himself. By then I'll already have flown high and far.

Once he was outside the house, a constriction rose in his chest and tears came to his eyes. Revenge, he told himself. Someday I'll wipe out all their clans and wash their homes in a sea of blood. With the bundle on his back he turned around and walked into the pale dawn.

After two hours' journey he arrived at Dismount Fort. He went directly to the train station, but he didn't buy a ticket. From now on he had to learn to get whatever he wanted without paying a fen. Four beggars were sleeping in a corner



inside the hall. Having hesitated for a few seconds, Lu went to join them, lying supine on the cement floor. With the bundle under his head and his army cap covering his face, he soon fell asleep. Though footsteps tapped about and clanking trains passed by, Lu was so tired that nothing disturbed him.

When he woke up, it was already past three in the afternoon. All the beggars were gone except an old man with red-rimmed eyes, sitting against the wall and holding an empty bottle in his lap. A locomotive was blowing its horn outside. Inside the dim hall a few rectangular patches of sunlight stretched on the floor. Lu's stomach rumbled and he felt hungry, but first he had to find out how to get to Beijing.

He asked the old beggar about the train schedule, and was surprised to learn that no train went directly to the capital. The old man said that Lu had better start by sneaking onto the midnight freight train to Dalian. Lu was a little confused by the advice. Then he realized that if he took a passenger train without a ticket, the attendants and the police could easily find him out and kick him off at any station.

After clarifying that, he got up and went out to solve the problem of hunger. Not knowing where to look for food, he walked along Market Street heading downtown. In front of Four Sea Fish Shop were about a hundred people lining up to buy something. Lu was curious and walked over. Seeing mountains of clams and oysters on the mat-covered ground, he felt his mouth watering. The folks here have a good life, he thought. They can have seafood every day. If only I could eat a few oysters. Oh, I'm so hungry. I'd like to bite them with the shells on.

But he tore himself away and took a right turn into Bath Street. The smell of fried leeks was hovering in the air. He caught the aroma and followed it instinctively. After he passed New Life Medical-Herb Store, the sign of Victory Restaurant emerged on the right. Lu hastened his steps to the door. He pushed aside the curtain of glass beads and entered the restaurant. About twenty diners were inside, but two teenage beggars were already sitting in a corner waiting for leftovers. Lu went to sit beside them, waiting to see how they begged.

A moment later one of the boys got up and walked to a nearby table, where a fat middle-aged man was eating with a small girl, obviously his daughter. Without saying a word the boy held out his hand beside the steaming dishes. The fat man broke his bread and put a piece on the dirty hand. Immediately the other beggar went up to the table and got his share. Lu followed suit and received a chunk of bread too. "All right, no more," the fat man said, and waved to Lu to go away.

Lu had never thought getting food could be so easy. Just stretch out your hand and you'll have white, tender, fresh bread to eat. It tasted so good that he thought he had never eaten steamed bread so delicious.

Then a young waitress came by, carrying a large fried yellow croaker still sizzling on the plate. After putting the dish in front of an old man, she pointed at the three beggars and said,

"You stay there and wait until the customers finish, or you get out of here." Strange to say, her menacing words sounded to Lu like a sweet tune. What a goddess! he thought.

Three other women, in their thirties and forties, were also busy waiting tables, but this young woman was absolutely glamorous in Lu's eyes. Her skin was whiter than the bread just out of the steamer. He looked at her fingers, so exquisite and almost transparent. And those gorgeous glossy bangs. She ought to be tender and pretty, Lu thought; see what they eat here, all the delicacies from sea and land. Feeding on such food, even a pig would grow smooth and sleek.

Within two hours Lu was stuffed with jelly soup, fried tofu, fish, oysters, pork, cabbage, pies, noodles, and even a half cup of sorghum liquor. Never at one meal had he eaten so many good things, which made him feel as if he were celebrating the Spring Festival. But something seemed missing. Yes, that young beauty. If only he could get close to her and pinch that pair of white paws. That would be real fun.

Unfortunately, a banquet was served after eight, so the three beggars were turned out. Having no place to go, Lu returned to the train station. The alcohol made him dizzy, yet he was very happy, because he found a beggar's life more enjoyable than his life at Ox Village. I ate so many good things, he thought, without paying a fen or raising a finger for them. Wonderful. I should stay here for some days, to eat more good stuff. If lucky, I can make a pass at that charming wench. Pretty, so pretty. He made clicks with his tongue, which wiped his lips now and then.

But another voice rose within him: You've forgotten all the trouble, huh? Bewitched by your lust for women again? Shame. Your wound hasn't begun to heal yet, but you've begun to forget the pain.

He looked down at his crotch. You little devil, you're playing tricks on me again. You can't take me in this time. I must go—go to Dalian tonight and switch trains there for Beijing. Too much pleasure surely weakens a man's will. I mustn't indulge myself. I've a long way to travel, to pursue a future of ten thousand *li*. Besides, it's always better on the road than at an inn.

He lay on the floor, taking catnaps and waiting for the midnight freight train. At ten o'clock he was roused by voices shouting, "Wake up! Wake up!"

Three militiamen were using their feet to push the beggars sleeping in the hall. Each of them wore a long wooden club across his back. "Show me your identification," a short militiaman said to the man lying beside Lu.

The beggar put his hand into a pocket inside his jacket and took out a piece of paper. The militiaman read it carefully and gave it back to him. Then he pointed at Lu and demanded, "Your identification."

"What identification?" Lu didn't understand what was going on.

"The paper that allows you to beg."

"Where can I get it?" Lu blurted out.

"From your brigade. Do you have it or not?"

"I had it yesterday, but I've lost it somewhere. I can't find it. Sorry."

The militiaman screwed up his brows. "Lost it? Who can believe you? You didn't even know where to get it. I think you are an escaped counterrevolutionary. If you can't prove who you are, you must come with us."

Lu knew it was no use refusing, so he got to his feet, standing by respectfully. After going through all the beggars, the militiamen took Lu to the police station on Old Folk Road. The policeman on duty told Lu that if he refused to identify himself, they would commit him to a reform-through-labor team. Lu was terrified, because he remembered that a "troublemaker" in his village had been sent to a place like that by the brigade leaders and had died of dysentery there two months later. Without any delay he confessed who he was and where he came from. They telephoned Ox Village and were told that Lu was being examined, and that they should send him back as soon as possible.

"I could tell at first sight that he was a bad egg," the short militiaman said. He went up to Lu and removed the fountain pen from Lu's breast pocket. "You don't need this. Pretending you can write, hmm? How many bottles of ink have you drunk?" He dropped the pen into a drawer.

Lu trembled all over, fearing they would search him. He had eleven yuan in his trouser pocket and two packets of expensive cigarettes in the bundle. Luckily, they didn't bother to look further.

That very night a jeep was going to Sand County to bring back the police chief, so they put Lu into the jeep, gave the driver a 1951 Russian pistol, and told him to drop Lu at Ox Village on the way. "If he escapes, shoot him," the policeman said loudly to the driver.

Lu had never been in an automobile; though he felt rather excited seeing houses, lights, trees, and wire poles flitting past, he was too anxious to enjoy the ride. He dared not move his body in the jeep, and kept wondering what was waiting for him in the village.

It was past midnight when he was back in his house again. After lighting the lamp, he was surprised to find that nothing seemed to have changed. Even the note was still under the lamp. He picked it up and saw, beneath his own writing, four big characters: "Nets Above, Snares Below." It was Secretary Zhao's handwriting.

Oh, Lu thought with a moan, it's impossible to go anywhere. I can't escape. They won't leave me alone until I

write out what they want. All the officials are of one family; I can never jump out of their palms.

After burning the note over the lamp, he lit a joss stick to keep mosquitoes away. Tired of worrying, he remembered an old saying: "If the enemy come, we have troops to stop them; if a flood comes, we have earth to dam it." Worrying is useless, he told himself; the cart will find its way around the hill when it gets there. He took off his clothes and went to bed, not allowing himself to think of anything. Soon he fell asleep.

He snored for seven hours without a stop. When he woke up, the sun already covered half the bed. He stretched his legs in the sunlight, and began worrying about the confession and thinking how to avoid the trial in the evening. Unable to come up with a plausible excuse and unable to stop missing the young waitress, he resumed cursing himself. All the trouble came from his inability to control his penis. Strange to say, that little fellow, ignoring its master's disgust and hatred, went erect again, bulging the front of Lu's underwear. Lu hated it. If only he could have plucked it out! It had no shame and fear, and wanted to go into action even in the face of danger and annihilation. He got up and put on his clothes. Still the erection wouldn't go away. He gave it two slaps with the sole of his rubber shoe. The beating somehow scared the little devil down.

Lu went out, washed his face, took a corn cake, and hurried to the field with a hoe on his shoulder and a large straw hat on his head. Whatever had happened, he must not be slack in his work. He should pretend that everything was normal.

Evening came. With only five pages of writing and with a vision of the leaders furious at his attempted escape, Lu dared not go to the brigade's office. He thought it better to stay home and wait until the leaders' anger waned a little. If they asked him the next day, he would say he had a stomachache and couldn't walk, and would beg them for a few more days. He cooked himself a pot of noodles with string beans, but he was too worried to

enjoy the food; he forced himself to think how to write a few more passages of the confession.

A clock with a long pendulum ticked away on the red chest. In the room two ducks perched in a corner while a few chickens strutted and pecked about. On the broad brick bed were scattered his son's clothes and toys and his wife's sewing bowl, filled with scraps of cloth, threads, partly stitched soles, scissors, awls. It was stuffy, so after supper Lu took off his undershirt and pants and wore only his shorts. He sat by the scrawled sheets of paper absentmindedly.



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 **LINCOLN**
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He didn't expect the leaders would come to his home to look for him. The second he saw them in the yard, he lay down and held his stomach with both hands. They burst in, and Wang yelled at Lu, "Sit up, you son of a tortoise!"

"Oh, I'm sick."

"Don't play tricks with your grandpas. We can see through you. Get up. I saw you hoeing turnips two hours ago. No illness can be so quick. Get your sorry ass up!"

Without a word Lu climbed up and sat on the edge of the bed.

"Why do you try to trick us?" Secretary Zhao asked.

"I'm sick. I really can't walk."

"Cut it out," Wang bellowed. "We know how you feel." Then he lowered his voice, saying, "All right, we're going to take care of our patient tonight. Come with us. We'll cure you of your illness in a couple of days."

Lu was terrified, his scalp numb. He knew they would apply the tactics called cartwheeling—they would take turns questioning him day and night, not allowing him to sleep until he collapsed, confessed everything, even invented things to please them. He could not possibly resist so many of them. If necessary, the leaders could send for a platoon of militiamen. He was so scared that he broke into tears. "Oh, I've cracked my brains, but I can't write more. I really don't know how to write. I've used a bottle of ink already. Please let me go just this once. I'm going to kowtow to you."

"Hold it," Wang ordered. "You can't deceive us any longer."

Scribe Hsiao stepped forward and restrained Lu from going to his knees.

"Oh, heaven," Lu cried out, "how can I convince you of my sincerity? Do you want me to die? All right—my family's already broken, and I don't want to live anymore." He pulled a large pair of scissors out of the sewing bowl and put them against his throat. "No more! If you want my life, say it. I'll die here to show you my remorse."

"Stop bluffing," Wang said, smiling with contempt. "I know what stuff'll come out the moment you raise your buttocks. Do it. Kill yourself. Then we'll believe you're a good, progressive comrade."

"Lu Han, don't take us to be beardless idiots," Zhao said. "Who's ever heard that a man killed himself with scissors? That's woman stuff."

"Do it," Wang ordered. "Let's have an eye-opener. We'll name you a Revolutionary Martyr and give your family provisions."

Lu was wailing, tears rolling down his cheeks.

"Yes, do it," Zhao demanded with his arms open. "We're waiting. If you don't, you're not a Chinese."

Lu moved the scissors down as if to prove his inability to kill himself. He turned around and bent down.

"What are you doing?" Wang said.

Lu ripped open his shorts, pulled out his scrotum, and cut it off together with the testicles. He dropped the cutting and fell to the ground, screaming and groaning. Immediately the

chickens rushed over and carried away those meaty parts.

"Stop the chickens and get his balls back!" Wang yelled, kicking at a duck that was on its way to the bloody spot.

Both the secretary and the scribe ran out, but it was too late—the chickens had disappeared into the dark yard. Inside, Wang was busy stanching the bleeding with a towel. The sleeves of his white shirt were covered with bloodstains. Still Wang never stopped cursing. "Damn your ancestors. Who told you to do this? I hope you're bleeding to death."

"I hate it, hate it!" Lu said through his teeth, clenched to choke his moaning. One of his legs was twitching, the toe drawing small circles on the ground.

Finally Wang managed to tie up Lu's crotch with three towels, and the blood was almost stopped. Then Hsiao returned with several men and with Chu's horse cart. They wrapped Lu up in a flowery quilt and carried him out. The moment they placed him in the cart, the horses set out galloping to the Commune Clinic in Dismount Fort. Both the leaders went with the cart. They even gave Lu sweet-potato liquor on the way to stop him from moaning and shaking.

 U'S self-castration earned him freedom. Nobody thought of pressing him for the confession again, since his act had indeed proved his remorse and sincerity. Naturally, a lot of men shook hands with him when he was back from town. The leaders even went to his father-in-law's house the day after the castration to persuade Lu's wife to forgive him and come back home. On hearing the sad news, Fulan burst into tears, saying that she was guilty and should not have mistreated her husband that way. Her father, a well-respected old man, scolded her in front of the leaders and ordered her to go back at once. That very day she returned with Baby Leopard in Chu's horse cart. Now she wanted to take good care of Lu and was determined to be a model wife.

As for Lu, he felt that things were fine. Losing his testicles didn't differ much from being sterilized by the family-planning team. Quite a few men in the village were castrated that way and the only difference was that they carried more weight below their bellies. Let others babble whatever they liked. Yes, he was gelded, but he had a son, who was as strong as a bear cub, to carry on his family line. From now on that devil of a penis would cause no trouble, and his family would enjoy peace and unity, which would surely lead to security and prosperity. Though he sweated more than before while working in the fields, his back had never been so straight and his body never so sturdy. People noticed that his face was glowing with ruddy health and his hair turning darker and thicker. He did so well that the villagers elected him an exemplary commune member. Secretary Zhao even had a heart-to-heart talk with him and encouraged him to write an application for Party membership, which Lu was, of course, delighted to do. Most significant of all, he had a new, normal life. ☸



Herman Melville and Nathaniel Hawthorne

by NANCY CALDWELL SOREL

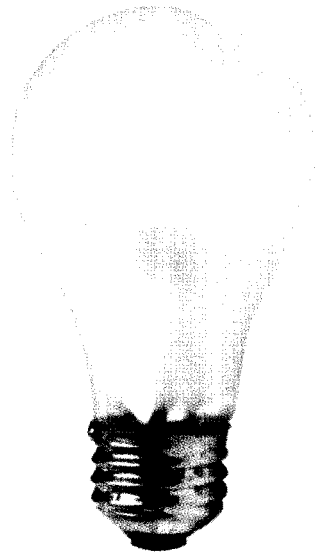
THE time was midsummer, midcentury, and the place—the Berkshires—was a magnet for the literati. Mr. D. D. Field, a mere lawyer, had conceived of a social climb up Monument Mountain and collected a few illustrious residents of the area for that purpose. Among them were poet-raconteur-physician-on-occasion Dr. Oliver Wendell Holmes, and Mr. James T. Fields, publisher to Mr. Nathaniel Hawthorne, novelist, also present. Then there was young Mr. Herman Melville—known as “the man who had lived among the cannibals”—author of books with strange titles like *Omoo* and *Typee*, and currently at work on a tale of his whaling voyage. Two young women were in attendance, as was—in spirit only—William Cullen Bryant, poetical elegist of an Indian maiden thwarted in love who, legend said, had thrown herself off a precipice of this same mountain.

After ascending as far as they could by carriage and wagon, the party set off on foot. It was a jolly venture. A thunder shower was not allowed to dampen spirits: sheltered under an over-

hang, the climbers sipped iced champagne from a silver mug and heard a recitation of Bryant’s poem, made more dramatic by thunder and flashes of lightning. When the rain stopped, they trekked on. At the summit an exuberant Melville stood boldly on a projecting ledge as on a ship’s deck and demonstrated hauling in sail, while the usually reserved Hawthorne playacted at scanning the horizon for a whale’s hump.

A three-hour dinner laced with wines and fine conversation followed, and by day’s end the very private Hawthorne, age forty-six, had invited Melville, thirty-one, to spend a few days with him. As it turned out, the man whose life had been defined by Salem’s insularity, but whose just-published novel, *The Scarlet Letter*, explored the depths of the human psyche, had a lot to offer the man whose formulating experience was “the sky above, the sea around, and nothing else.” Under the spell of Hawthorne’s bent toward allegory and the seductive persuasiveness of his handsome person, Melville rewrote his whaling story and dedicated *Moby-Dick* to his friend.

How many government workers does it take to change a light bulb?



Actually, it should take just one -- and it should take only a few seconds.

But the sorry truth is that government workers who change light bulbs and provide a thousand other public services are often unable to do the job the way it ought to be done.

The reason? At every level of government there are layers and layers of management, sometimes five or more between headquarters and the job site. That means red tape, endless procedures, countless lines of authority.

It's what the Brookings Institution meant when it condemned the "thicket of agency-specific housekeeping regulations and standard operating procedures" that gum up the public sector and hamstring front-line workers.

It's why the public worker assigned to repair a garbage truck or fill a pothole or clean up toxic

waste must first seek permission from a supervisor who might have to go through procurement before having a form in triplicate ready for three higher-ups to sign.

It's not only inefficient. It's a drain on our tax dollars. And essential services don't get done the way they should.

There is a better way. It works whenever it's tried. It's what successful corporations are doing. Treat workers as resources. Free them from bureaucratic interference. Let them make decisions on site. Train them for more responsibility. Cut out unnecessary management layers. Redesign the government workplace.

Taxpayers benefit. Services improve. Everyone wins.

Sometimes all it takes to change a light bulb is a little bit of vision.

**PUBLIC EMPLOYEES
PARTNERS FOR CHANGE**

REINVENTING THE WHEELS

by AMORY B. LOVINS AND L. HUNTER LOVINS

New ways to design, manufacture, and sell cars can make them ten times more fuel-efficient, and at the same time safer, sportier, more beautiful and comfortable, far more durable, and probably cheaper. Here comes the biggest change in industrial structure since the microchip

ON September 29, 1993, the unthinkable happened. After decades of adversarial posturing, and months of intensive negotiations with Vice President Al Gore, the heads of the Big Three auto makers accepted President Bill Clinton's challenge to collaborate. They committed their best efforts, with the help of government technologies and funding, to developing a tripled-efficiency "clean car" within a decade, and a year later they reported encouraging progress. Like President John F. Kennedy's goal of putting people on the moon, the Partnership for a New Generation of Vehicles (PNGV) aims to create a leapfrog mentality—this time in Detroit. However, the PNGV's goal is both easier to attain and more important than that of the Apollo program. It could even become the core of a green industrial renaissance—instigating a profound change not only in what and how much we drive but in how our whole economy works.

The fuel efficiency of cars has been stagnant for the past decade. Yet the seemingly ambitious goal of tripling it in the next decade can be far surpassed. Well before 2003 competition, not government mandates, may bring to market cars efficient enough to carry a family coast to coast on one tank of fuel, more safely and comfortably than they can travel now, and more cleanly than they would with a battery-electric car plus the power plants needed to recharge it.



To understand what a profound shift in thinking this represents, imagine that one seventh of America's gross national product is derived from the Big Three typewriter makers (and their suppliers, distributors, dealers, and other attendant businesses). Over decades they've progressed from manual to electric to type-ball designs. Now they're developing tiny refinements for the forthcoming Selectric XVII. They profitably sell around 10 million excellent typewriters a year. But a problem emerges: the competition is developing wireless subnotebook computers.

That's the Big Three auto makers today. With more skill than vision, they've been painstakingly pursuing incremental refinements on the way to an America where foreign cars fueled with foreign oil cross crumbling bridges. Modern cars are an extraordinarily sophisticated engineering achievement—the highest expression of the Iron Age. But they are obsolete, and the time for incrementalism is over. Striking innovations have occurred in advanced materials, software, motors, power electronics, microelectronics, electricity-storage devices, small engines, fuel cells, and computer-aided design and manufacturing. Artfully integrated, they can yield safe, affordable, and otherwise superior family cars getting hundreds of miles per gallon—roughly ten times the 30 mpg of new cars today and several times the 80-odd mpg sought by the PNGV.

Achieving this will require a completely new car design—the ultralight hybrid, or “hypercar” (a term we now prefer to our earlier term “supercar,” because that also refers to ultra-powerful cars that get a couple of hundred miles per hour rather than per gallon). The hypercar’s key technologies already exist. Many firms around the world are starting to build prototypes. The United States is best positioned to bring the concept to market—and had better do so, before others do. Hypercars, not imported luxury sedans, are the biggest threat to Detroit. But they are also its hope of salvation.

THE ULTRALIGHT STRATEGY

DECADES of dedicated effort to improve engines and power trains have reduced to only about 80–85 percent the portion of cars’ fuel energy that is lost before it gets to the wheels. (About 95 percent of the resulting wheelpower hauls the car itself, so that less than two percent of the fuel energy actually ends up hauling the driver.)

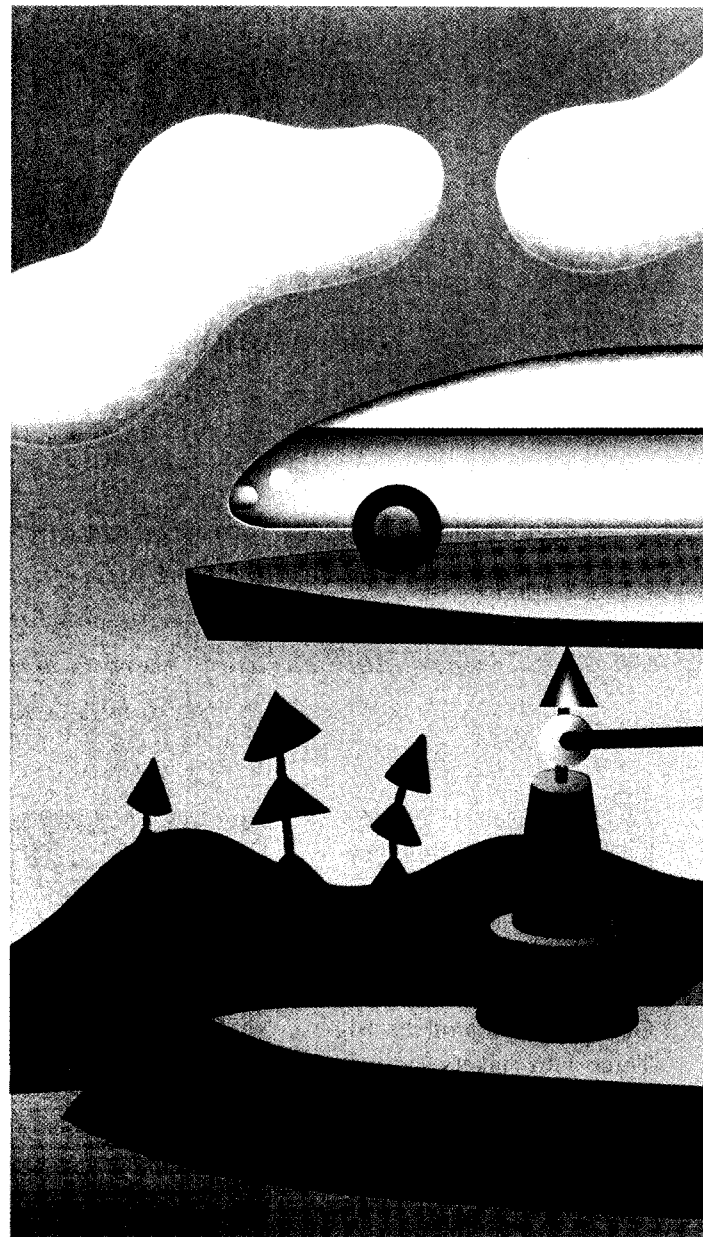
This appalling waste has a simple main cause: cars are made of steel, and steel is heavy, so powerful engines are required to accelerate them. Only about one sixth of the average engine’s power is typically needed for highway driving, and only about one twentieth for city driving. Such gross oversizing halves the engine’s average efficiency and complicates efforts to cut pollution. And the problem is getting worse: half the efficiency gains since 1985 have been squandered on making engines even more powerful.

Every year auto makers add more gadgets to compensate a bit more for the huge driveline losses inherent in propelling steel behemoths. But a really efficient car can’t be made of steel, for the same reason that a successful airplane can’t be made of cast iron. We need to design cars less like tanks and more like airplanes. When we do, magical things start to happen, thanks to the basic physics of cars.

Because about five to seven units of fuel are needed to deliver one unit of energy to the wheels, saving energy at the wheels offers immensely amplified savings in fuel. Wheelpower is lost in three ways. In city driving on level roads about a third of the wheelpower is used to accelerate the car, and hence ends up heating the brakes when the car stops. Another third (rising to 60–70 percent at highway speeds) heats the air the car pushes aside. The last third heats the tires and the road.

The key to a superefficient car is to cut all three losses by making the car very light and aerodynamically slippery, and then recovering most of its braking energy. Such a design could:

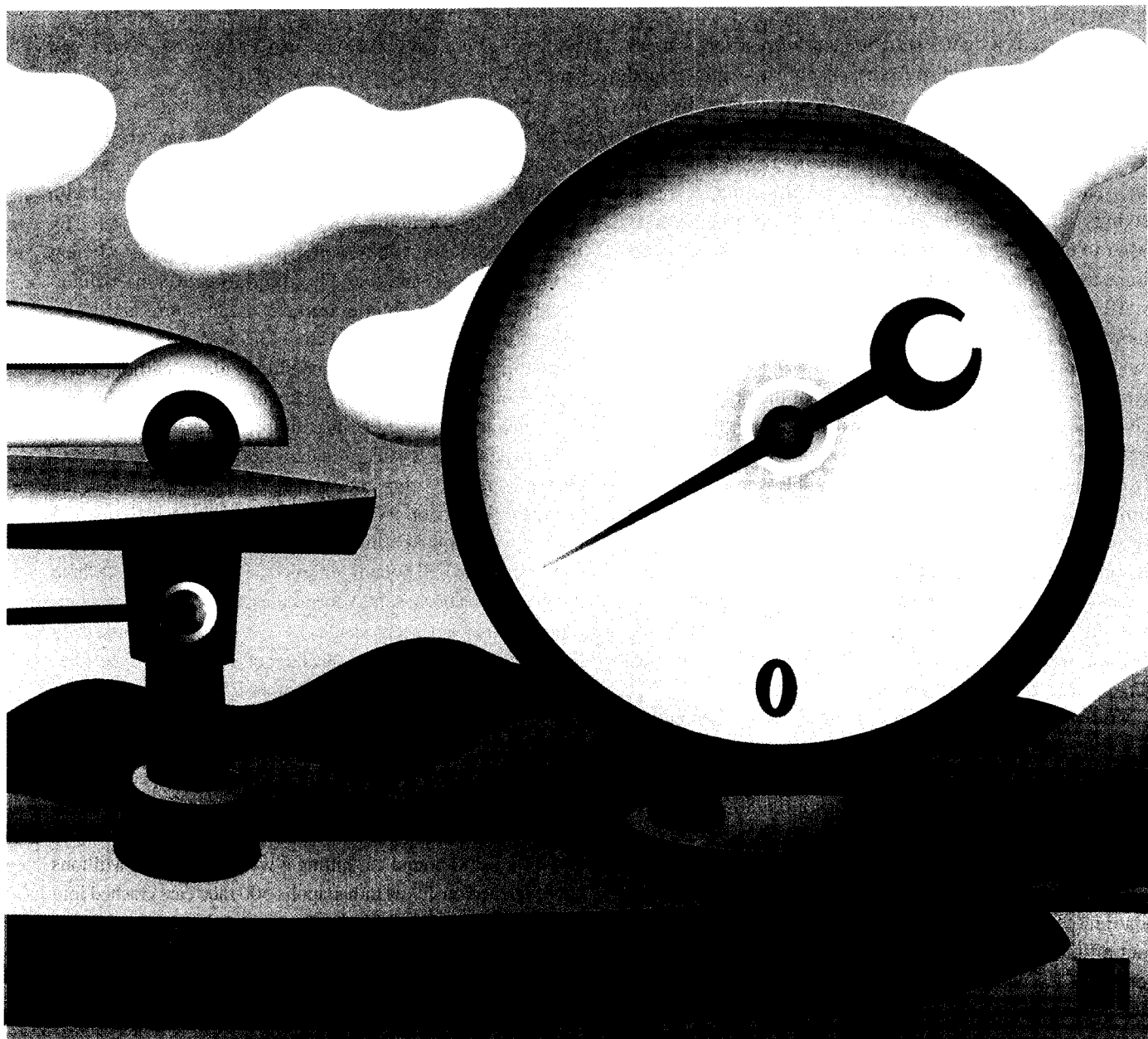
- cut weight (hence the force required for acceleration) by 65–75 percent through the use of advanced materials, chiefly synthetic composites, while improving safety through greater strength and sophisticated design
- cut aerodynamic drag by 60–80 percent through sleeker streamlining and more-compact packaging



- cut tire and road energy loss by 65–80 percent through the combination of better tires and lighter weight.

Once this “ultralight strategy” has largely eliminated the losses of energy that can’t be recovered, the only other place the wheelpower can go is into braking. And if the wheels are driven by special electric motors that can also operate as electronic brakes, they can convert unwanted motion back into useful electricity.

However, a hypercar isn’t an ordinary electric car, running on batteries that are recharged by being plugged into utility power. Despite impressive recent progress, such cars still can’t carry very much or go very far without needing heavy batteries that suffer from relatively high cost and short life. Since gasoline and other liquid fuels store a hundred times as much useful energy per pound as batteries do, a long driving range is best achieved by carrying energy in the form of fuel, not batteries, and then burning that



fuel as needed in a tiny onboard engine to make the electricity to run the wheel motors. A few batteries (or, soon, a carbon-fiber “superflywheel”) can temporarily store the braking energy recovered from those wheel motors and reuse at least 70 percent of it for hill climbing and acceleration. With its power so augmented, the engine needs to handle only the average load, not the peak load, so it can shrink to about a tenth the current normal size. It will run at or very near its optimal point, doubling efficiency, and turn off whenever it’s not needed.

This arrangement is called a “hybrid-electric drive,” because it uses electric wheel motors but makes the electricity onboard from fuel. Such a propulsion system weighs only about a fourth as much as that of a battery-electric car, which must haul a half ton of batteries down to the store to buy a six-pack. Hybrids thus offer the advantages of electric propulsion without the disadvantages of batteries.

ONE PLUS TWO EQUALS TEN

AUTO makers and independent designers have already built experimental cars that are ultralight or hybrid-electric but seldom both. Yet combining these approaches yields extraordinary, and until recently little-appreciated, synergies. Adding hybrid-electric drive to an ordinary car increases its efficiency by about a third to a half. Making an ordinary car ultralight but not hybrid approximately doubles its efficiency. Doing both can boost a car’s efficiency by about *tenfold*.

This surprise has two main causes. First, as already explained, the ultralight loses very little energy irrecoverably to air and road friction, and the hybrid-electric drive recovers most of the rest from the braking energy. Second, saved weight compounds. When you make a heavy car one pound

lighter, you in effect make it about a pound and a half lighter, because it needs a lighter structure and suspension, a smaller engine, less fuel, and so forth to haul that weight around. But in an ultralight, saving a pound may save more like five pounds, partly because power steering, power brakes, engine cooling, and many other normal systems become unnecessary. The design becomes radically simpler. Indirect weight savings snowball faster in ultralights than in heavy cars, faster in hybrids than in nonhybrids, and fastest of all in optimized combinations of the two.

All the ingredients needed to capture these synergies are known and available. As far back as 1921 German auto makers demonstrated cars that were about twice as slippery aerodynamically as today's cars are. Most of the drag reduction can come from such simple means as making the car's underside as smooth as its top. Today's best experimental family cars are 25 percent more slippery still. At the same time, ultrastrong new materials make the car's shell lighter. A lighter car needs a smaller engine, and stronger walls can be thin; both changes can make the car bigger inside but smaller outside. The smaller frontal area combines with the sleeker profile to cut through the air with about one third the resistance of today's cars. Advanced aerodynamic techniques may be able to double this saving.

Modern radial tires, too, waste only half as much energy as 1970s bias-ply models, and the best 1990 radials roughly halve the remaining loss. "Rolling resistance" drops further in proportion to weight. The result is a 65–80 percent decrease in losses to rolling resistance, which heats the tires and the road.

Suitable small gasoline engines, of the size found in outboard motors and scooters, can already be more than 30 percent efficient, diesels 40–50 percent (56 percent in lab experiments). Emerging technologies also look promising, including miniature gas turbines and fuel cells—solid-state, no-moving-parts devices that silently and very efficiently turn fuel into electricity, carbon dioxide, water, and a greatly reduced amount of waste heat.

In today's cars, accessories—power steering, heating, air conditioning, ventilation, lights, and entertainment systems—use about a tenth of the engine's power. But a hypercar would use scarcely more energy than that for all purposes, by saving most of the wheelpower *and* most of the accessory loads. Ultralights not only handle more nimbly, even without power steering, but also get all-wheel anti-lock braking and anti-slip traction from their special wheel motors. New kinds of headlights and taillights shine brighter on a third the energy, and can save even more weight by using fiber optics to distribute a single pea-sized lamp's light throughout the car. Air conditioning would need perhaps a tenth the energy used by today's car air conditioners, which are big enough for an Atlanta house. Special paints, vented double-skinned roofs, visually clear but heat-reflecting windows, solar-powered vent fans, and so forth can exclude un-

wanted heat; innovative cooling systems, run not directly by the engine but by its otherwise wasted by-product heat, can handle the rest.

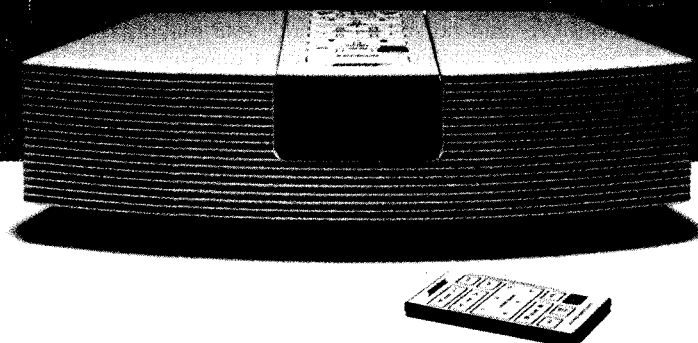
Perhaps the most striking and important savings would come in weight. In the mid-1980s many auto makers demonstrated "concept cars" that would carry four or five passengers but weighed as little as 1,000 pounds (as compared with today's average of about 3,200). Conventionally powered by internal combustion, they were two to four times as efficient as today's average new car. Those cars, however, used mainly light metals like aluminum and magnesium, and lightweight plastics. The same thing can be done better today with composites made by embedding glass, carbon, polyaramid, and other ultrastrong fibers in special moldable plastics—much as wood embeds cellulose fibers in lignin.

In Switzerland, where more than 2,000 lightweight battery-electric cars (a third of the world's total) are already on the road, the latest roomy two-seaters weigh as little as 575 pounds without their batteries. Equivalent four-seaters would weigh less than 650 pounds, or less than 850 including a whole hybrid propulsion system. Yet crash tests prove that such an ultralight can be at least as safe as today's heavy steel cars, even if it collides head-on with a steel car at high speed. That's because the composites are extraordinarily strong and bouncy, and can absorb far more energy per pound than metal can. Materials and design are much more important to safety than mere mass, and the special structures needed to protect people don't weigh much. (For example, about ten pounds of hollow, crushable carbon-fiber-and-plastic cones can absorb all the crash energy of a 1,200-pound car hitting a wall at 50 mph.) Millions have watched on TV as Indianapolis 500 race cars crashed into walls at speeds around 230 mph: parts of the cars buckled or broke away in a controlled, energy-absorbing fashion, but despite per-pound crash energies many times those of highway collisions, the cars' structure and the drivers' protective devices prevented serious injury. Those were carbon-fiber cars.

In 1991, fifty General Motors experts built an encouraging example of ultralight composite construction, the sleek and sporty four-seat, four-airbag Ultralite, which packs the interior space of a Chevrolet Corsica into the exterior size of a Mazda Miata. The Ultralite should be both safer and far cleaner than today's cars. Although it has only a 111-horsepower engine, smaller than a Honda Civic's, its light weight (1,400 pounds) and low air drag, both less than half of normal, give it a top speed of 135 mph and a 0-to-60 acceleration of 7.8 seconds—comparable to a BMW 750iL with a huge V-12 engine. But the Ultralite is more than four times as efficient as the BMW, averaging 62 mpg—twice today's norm. At 50 mph it cruises at 100 mpg on only 4.3 horsepower, a mere fifth of the wheelpower normally needed.

If equipped with hybrid drive, this 1991 prototype, built in only a hundred days, would be three to six times as efficient as today's cars. Analysts at Rocky Mountain Institute have simulated 300–400-mpg four-seaters with widely available

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technology, and cars getting more than 600 mpg with the best ideas now in the lab. Last November a four-seater, 1,500-pound Swiss prototype was reported to achieve 90 mpg cruising on the highway; at urban speeds, powered by its 573 pounds of batteries, it got the equivalent of 235 mpg.

Similar possibilities apply to larger vehicles, from pickup trucks to eighteen-wheelers. A small Florida firm has tested composite delivery vans that weigh less loaded than normal steel vans weigh empty, and has designed a halved-weight bus. Other firms are experimenting with streamlined composite designs for big trucks. All these achieve roughly twice normal efficiency with conventional drivelines, and could redouble that with hybrids.

Hypercars are also favorable to—though they don't require—ultraclean alternative fuels. Even a small, light, cheap fuel tank could store enough compressed natural gas or hydrogen for long-range driving, and the high cost of hydrogen would become unimportant if only a tenth as much of it were needed as would be to power cars like today's. Liquid fuels converted from sustainable farm and forestry wastes, too, would be ample to run such efficient vehicles without needing special crops or fossil hydrocarbons. Alternatively, solar cells on a hypercar's body could recharge its onboard energy storage about enough to power a standard southern-California commuting cycle without turning on the engine.

Even if a hypercar used conventional fuel and no solar boost, its tailpipe could emit less pollution than would the power plants needed to recharge a battery-electric car. Being therefore cleaner, even in the Los Angeles air shed, than so-called zero-emission vehicles (actually "elsewhere-emission," mainly from dirty coal-fired power plants out in the desert), ultralight hybrids should qualify as ZEVs, and probably will. Last May the California Air Resources Board reaffirmed its controversial 1990 requirement—which some northeastern states want to adopt as well—that two percent of new-car sales in 1998, rising to 10 percent in 2003, be ZEVs. Previously this was deemed to mean battery-powered electric cars exclusively. But, mindful of hypercars' promise, the CARB staff is considering broadening the ZEV definition to include anything cleaner. This alternative compliance path could be a big boost both for hypercar entrepreneurs and for clean air: each car will be cleaner, and far more hypercars than battery cars are likely to be bought. By providing a large payload, unlimited range, and high performance even at low temperatures, hypercars vault beyond battery cars' niche-market limitations.

This result brings full circle the irony of California's ZEV mandate. Originally it drew howls of anguish from auto makers worried that people would not buy enough of the costlier, limited-range cars it obliges them to sell. The business press ridiculed California for trying to prescribe an impractical direction of technological development. Yet that visionary mandate is creating the solution to the problems.

Like the aerospace, microchip, and computer industries, hypercars will be the offspring of a technology-forcing government effort to steer the immense power of Yankee ingenuity. For it is precisely the California ZEV mandate that radically advanced electric-propulsion technology—thereby setting the stage for the happy combination with ultralight construction which we call the hypercar.

BEYOND THE IRON AGE

THE moldable synthetic materials in the GM and Swiss prototypes have fundamental advantages over the metals that now dominate auto making. The modern steel car, which costs less per pound than a McDonald's quarter-pound hamburger, skillfully satisfies often conflicting demands (to be efficient yet safe, powerful yet clean): steel is ubiquitous and familiar, and its fabrication is exquisitely evolved. Yet this standard material could be quickly displaced—as has happened before. In the 1920s the wooden framing of U.S. car bodies was rapidly displaced by steel. Today composites dominate boatbuilding and are rapidly taking over aerospace construction. Logically, cars are next.

Driving this transition are the huge capital costs of designing, tooling, manufacturing, and finishing steel cars. For a new model, a thousand engineers spend a year designing and a year making half a billion dollars' worth of car-sized steel dies, the costs of which can take many years to be recovered. This inflexible tooling in turn demands huge production runs, maroons company-busting investments if products flop, and magnifies financial risks by making product cycles go further into the future than markets can be forecast. That this process works is an astonishing accomplishment, but it's technically baroque and economically perilous.

Moldable composites must be designed in utterly different shapes. But their fibers can be aligned to resist stress and interwoven to distribute it, much as a cabinetmaker works with the grain of wood. Carbon fiber can achieve the same strength as steel at half to a third of the weight, and for many uses other fibers, such as glass and polyaramid, are as good as or better than steel and 50–85 percent cheaper. But composites' biggest advantages emerge in manufacturing.

Only 15 percent of the cost of a typical steel car part is for the steel; the other 85 percent pays for pounding, welding, and smoothing it. But composites and other molded synthetics emerge from the mold already in virtually the required shape and finish. And large, complex units can be molded in one piece, cutting the parts count to about one percent of what is now normal, and the assembly labor and space to roughly 10 percent. The lightweight, easy-to-handle parts fit together precisely. Painting—the hardest, most polluting, and costliest step in auto making, accounting for nearly half the cost of painted steel body parts—can be eliminated by

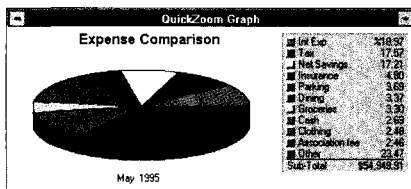
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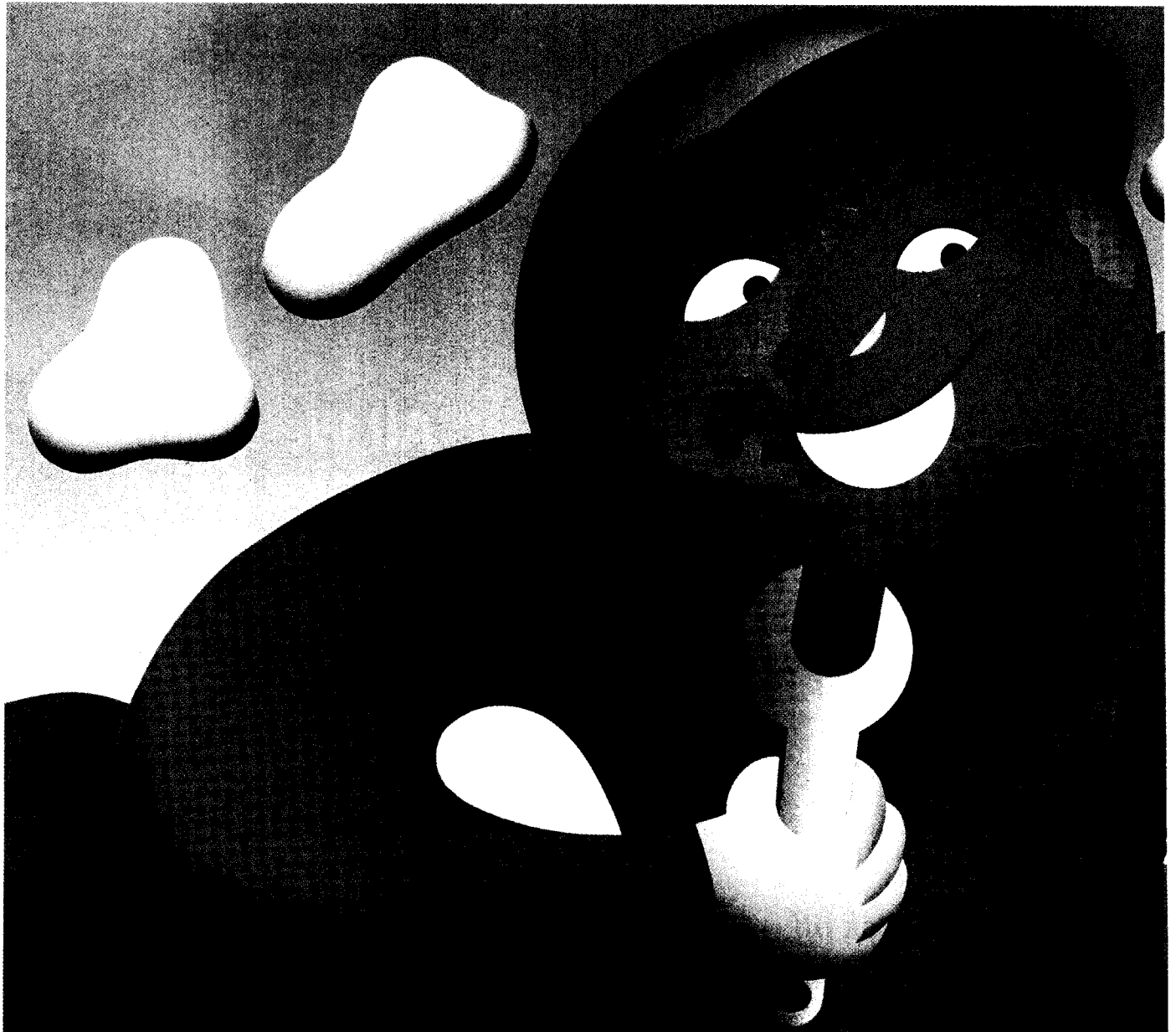
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laid-in-the-mold color. Unless recycled, composites last virtually forever: they don't dent, rust, or chip. They also permit advantageous car design, including frameless monocoque bodies (like an egg, the body *is* the structure), whose extreme stiffness improves handling and safety.

Composites are formed to the desired shape not by multiple strikes with tool-steel stamping dies but in single molding dies made of coated epoxy. These dies wear out much faster than tool-steel dies, but they're so cheap that their lack of durability doesn't matter. Total tooling cost per model is about half to a tenth that of steel, because far fewer parts are needed; because only one die set per part is needed, rather than three to seven for successive hits; and because the die materials and fabrication are much cheaper. Stereolithography—a three-dimensional process that molds the designer's computer images directly into complex solid objects overnight—can dramatically shrink tooling time. Indeed, the

shorter life of epoxy tools is a fundamental strategic advantage, because it permits the rapid model changes and continuous improvement that product differentiation and market nimbleness demand—a strategy of small design teams, small production runs, a time to market of only weeks or months, rapid experimentation, maximum flexibility, and minimum financial risk.

Together these advantages cancel or overturn the apparent cost disadvantage of the composites. Carbon fiber recently cost around forty times as much per pound as sheet steel, though increased production is leading manufacturers to quote carbon prices half to a quarter of that. Yet the cost of a mass-produced composite car is probably comparable to or less than that of a steel car, at both low production volumes (like Porsche's) and high ones (like Ford's). What matters is not cost per pound but cost per car: costlier fiber is offset by cheaper, more agile manufacturing.



SHIFTING GEARS IN COMPETITIVE STRATEGY

ULTRALIGHT hybrids are not just another kind of car. They will probably be made and sold in completely new ways. In industrial and market structure they will be as different from today's cars as computers are from typewriters, fax machines from telexes, and satellite pagers from the Pony Express.

Many people and firms in several countries are starting to realize what hypercars mean; at least a dozen capable entities, including auto makers, want to sell them. This implies rapid change on an unprecedented scale. If ignored or treated as a threat rather than grasped as an opportunity, the hypercar revolution could cost the United States millions of jobs and thousands of companies. Auto making and associated businesses employ one seventh of U.S. workers (and close to two

fifths of workers in some European countries). Cars represent a tenth of America's consumer spending, and use nearly 70 percent of the nation's lead, about 60 percent of its rubber, carpeting, and malleable iron, 40 percent of its machine tools, 15 percent of its aluminum, glass, and semiconductors, and 13 percent of its steel. David Morris, a cofounder of the Institute for Local Self-Reliance, observes, "The production of automobiles is the world's number-one industry. The number-two industry supplies their fuel. Six of America's ten largest industrial corporations are either oil or auto companies. . . . A recent British estimate concludes that half of the world's earnings may be auto- or truck-related." Whether the prospect of hypercars is terrifying or exhilarating thus depends on how well we grasp and exploit their implications.

The distribution of hypercars could be as revolutionary as their manufacture. On average, today's cars are marked up about 50 percent from production costs (which include prof-

it, plant costs, and warrantied repairs). But cheap tooling might greatly reduce the optimal production scale for hypercars. Cars could be ordered directly from the local factory, made to order, and delivered to one's door in a day or two. (Toyota now takes only a few days longer than that with its steel cars in Japan.) Being radically simplified and ultra-reliable, they could be maintained by technicians who come to one's home or office (Ford does this in Britain today), aided by plug-into-the-phone remote diagnostics. If all this makes sense for a \$1,500 mail-order personal computer, why not for a \$15,000 car?

Such just-in-time manufacturing would eliminate inventory, its carrying and selling costs, and the discounts and rebates needed to move existing stock that is mismatched to demand. The present markup could largely vanish, so that hypercars would be profitably deliverable at or below today's prices even if they cost considerably more to make, which they probably wouldn't.

America leads—for now—both in start-up-business dynamism and in all the required technical capabilities. After all, hypercars are much more like computers with wheels than they are like cars with chips: they are more a software than a hardware problem, and competition will favor the innovative, not the big. Comparative advantage lies not with the most efficient steel-stampers but with the fastest-learning systems integrators—with innovative manufacturers like Hewlett-Packard and Compaq, and strategic-element makers like Microsoft and Intel, more than with Chrysler or Matsushita. But even big and able firms may be in for a rough ride: the barriers to market entry (and exit) should be far lower for hypercars than for steel cars. Much as in existing high-tech industries, the winners might be some smart, hungry, unknown aerospace engineers tinkering in a garage right now—founders of the next Apple or Xerox.

All this is alien to the thinking of most (though not all) auto makers today. Theirs is not a composite-molding/electronics/software culture but a diemaking/steel-stamping/mechanical culture. Their fealty is to heavy metal, not light synthetics; to mass, not information. Their organizations are dedicated, extremely capable, and often socially aware, but have become prisoners of past expenditures. They treat those historical investments as unamortized assets, substituting accounting for economic principles and throwing good money after bad. They have tens of billions of dollars, and untold psychological investments, committed to stamping steel. They know steel, think steel, and have a presumption in favor of steel. They design cars as abstract art and then figure out the least unsatisfactory way to make them, rather than seeking the best ways to manufacture with strategically advantageous materials and then designing cars to exploit those manufacturing methods.

The wreckage of the mainframe-computer industry should have taught us that one has to replace one's own products with better new products before someone else does. Until recently few auto makers appreciated the starkness of the threat. Their

strategy seemed to be to milk old tools and skills for decades, watch costs creep up and market share down, postpone any basic innovation until after all the executives' planned retirement dates—and hope that none of their competitors was faster. That's a bet-the-company strategy, because even one superior competitor can put a company out of business, and the company may not even know who the competitor is until too late. The PNGV is stimulating instead a winning, risk-managed strategy: leapfrogging to ultralight hybrids.

It is encouraging that some auto makers now show signs of understanding the problem. In recent months the PNGV has sparked new thinking in Detroit. The industry's more imaginative engineers are discovering that the next gains in car efficiency should be easier than the last ones were, because they will come not from sweating off fat ounce by ounce but from escaping an evolutionary trap. Although good ultralight hybrids need elegantly simple engineering, which is difficult, one can more easily boost efficiency tenfold with hypercars than threefold with today's cars.

Little of this ferment is visible from the outside, because auto makers have learned reticence the hard way. A long and unhappy history of being required to do (or exceed) whatever they admit they can do has left them understandably bashful about revealing capabilities, especially to Congress. And firms with innovative ambitions will hardly be eager to telegraph them to competitors. Corporations share a natural desire to extract any possible business and political concessions, and to hold back from extending to traditional adversaries (such as the media, politicians, and environmentalists) any trust that could prove costly if abused or not reciprocated. Thus automakers are more likely to understate than to trumpet progress. Also, the Big Three are progressing unevenly, both internally and comparatively: their opacity conceals a rapidly changing mixture of exciting advances and inertia. Only some executives appreciate that hypercars fit the compelling strategic logic in favor of changing how their companies do business, especially by radically reducing cycle times, capital costs, and financial risks. It is difficult but vital for harried managers to focus on these goals through the distracting fog of fixing flaws in their short-term operations. But signs of rapid cultural change are looming, such as General Motors' announcement, last February 3, that its corporate policy now includes the CERES (Coalition for Environmentally Responsible Economies) Principles, formerly known as the Valdez Principles—a touchstone of environmentalists.

THE COST OF INACTION

THE potential public benefits of hypercars are enormous—in oil displacement, energy security, international stability, forgone military costs, balance of trade, climatic protection, clean air, health and safety, noise reduction, and quality of urban life. Promptly and skillfully exploited, hypercars could also propel an industrial renewal.

They're good news for industries (many of them now demilitarizing) such as electronics, systems integration, aerospace, software, petrochemicals, and even textiles (which offer automated fiber-weaving techniques). The talent needed to guide the transition is abundant in American labor, management, government, and think tanks, but it's not yet mobilized. The costs of that complacency may be high.

Cars and light trucks use about 37 percent of the nation's oil, about half of which is imported at a cost of around \$50 billion a year. We Americans recently put our sons and daughters in 0.56 mpg tanks and 17-feet-per-gallon aircraft carriers because we hadn't put them in 32 mpg cars—sufficient, even if we'd done nothing else, to have eliminated the need for American oil imports from the Persian Gulf. Of course, more than just oil was at stake in the Gulf War, but we would not have sent half a million troops there if Kuwait simply grew broccoli. Even in peacetime the direct cost to the nation of Persian Gulf oil—mostly paid not at the pump but in taxes for some \$50 billion a year in military readiness to intervene in the Gulf—totals nearly \$100 a barrel of crude, making it surely the costliest oil in the world.

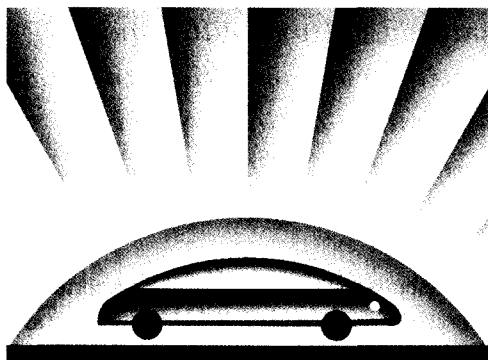
Had we simply kept on saving oil as effectively after 1985 as we had saved it for the previous nine years, we wouldn't have needed a drop of oil from the Persian Gulf since then. But we didn't—and it cost us \$23 billion for extra imports in 1993 alone. Gulf imports were cut by about 90 percent from 1977 to 1985 (chiefly by federal standards that largely or wholly caused new-car efficiency to double from 1973 to 1986). Yet they are now reapproaching a historic high—the direct result of twelve years of a national oil pol-

my. Auto makers should be given strong incentives to pursue the leapfrog strategy boldly, and customers should be encouraged to overcome their well-known lack of interest in buying fuel-thrifty cars in a nation that insists on gasoline cheaper than bottled water.

MARKET CONDITIONING AND PUBLIC POLICY

THE usual prescription of economists, environmentalists, and the Big Three—though, it seems, a politically suicidal one—is stiff gasoline taxes. After painful debate Congress recently raised the gasoline tax by 4.3 cents a gallon, leaving the price, corrected for inflation, the lowest both in the industrial world and in U.S. history. But in Western Europe and Japan taxes that raise the price of motor fuel to two or four times that in the United States have long been in place, with unspectacular results. Gasoline costing two to five dollars a gallon has modestly reduced distances driven but has had less of an effect on the efficiency of new cars bought. New German and Japanese cars are probably *less* efficient than American ones, especially when performance, size, and features are taken into account. Costlier fuel is a feeble incentive to buy an efficient car, because the fuel-price signal is diluted (in the United States today, by seven to one) by the other costs of owning and running a car. It is, as well, weakened by high consumer discount rates over a brief expected ownership, and often vitiated by company-owned cars and other distortions that shield many drivers from their cars' costs.

This market failure could be corrected by strengthening



Promptly and skillfully exploited, hypercars could propel an industrial renewal. The talent needed to guide the transition is abundant, but it's not yet mobilized. The costs of complacency may be high.

icy consisting mainly of weakened efficiency standards, lavish subsidies, and the Seventh Fleet.

The national stakes therefore remain large. And even though the PNGV is starting to re-create Detroit's sense of adventure, hypercars still face formidable obstacles, both culturally within the auto industry and institutionally in the marketplace. Whether or not their advantages make their ultimate adoption certain, the transition could be either unnecessarily disruptive, shattering industrial regions and job markets, or unnecessarily slow and erratic in capturing the strategic benefits of saving oil and rejuvenating the econo-

government efficiency standards. But standards, though effective and a valuable backstop, are not easy to administer, can be evaded, and are technologically static: they offer no incentive to keep doing better. Happily, at least one market-oriented alternative is available: the "feebate."

Under the feebate system, when you buy a new car, you pay a fee or get a rebate. Which and how big depends on how efficient your new car is. Year by year the fees pay for the rebates. (This is not a new tax. In 1990 the California legislature agreed, approving a "Drive+" feebate bill by a seven-to-one margin, although outgoing Governor George Deukmejian ve-

toed it.) Better still, the rebate for an efficient new car could be based on how much more efficient it is than an old car that's scrapped (not traded in). A rebate of several thousand dollars for each 0.01-gallon-per-mile difference would pay about \$5,000 to \$15,000 of the cost of an efficient new car. That would rapidly get efficient, clean cars on the road and inefficient, dirty cars off the road (a fifth of the car fleet produces perhaps three fifths of its air pollution). The many variants of such "accelerated-scrappage" incentives would encourage competition, reward Detroit for bringing efficient cars to market, and open a market niche in which to sell them. Feebates might even break the political logjam that has long trapped the United States in a sterile debate over higher gasoline taxes versus stricter fuel-efficiency standards—as though those were the only policy options and small, slow, incremental improvements were the only possible technical ones.

Perhaps people would buy hypercars, just as they switched from vinyl records to compact discs, simply because they're a superior product: cars that could make today's most sophisticated steel cars seem clunky and antiquarian by comparison. If that occurred, gasoline prices would become uninteresting. Scholastic debates about how many price elasticities can dance on the head of a pin would die away. The world oil price would permanently crash as superefficient vehicles saved as much oil as OPEC now extracts. Feebates would remain helpful in emboldening and rewarding Detroit for quick adaptation, but perhaps would not be essential. The ultralight hybrid would sweep the market. What then?

Then we would discover that hypercars cannot solve the problem of too many people driving too many miles in too many cars; indeed, they could intensify it, by making driving even more attractive, cheaper, and nearly free per extra mile driven. Having clean, roomy, safe, recyclable, renewably fueled 300 mpg cars doesn't mean that eight million New Yorkers or a billion still-carless Chinese can drive them. Drivers would no longer run out of oil or air but would surely run out of roads, time, and patience. Avoiding the constraint du jour requires not only having great cars but also being able to leave them at home most of the time. This in turn requires real competition among all modes of access, including those that displace physical mobility, such as telecommunications. The best of them is already being where we want to be—achievable only through sensible land use.

Such competition requires a level playing field with honest pricing, so that drivers (and everyone else) will both get what they pay for and pay for what they get. But least-cost choices are inhibited today by central planning and socialized financing of car-based infrastructure, such as roads and parking, while alternative modes must largely pay their own way. Happily, emerging policy instruments could foster and monetize fair competition among all modes of access. Some could even make markets in "negamiles" and "negatrips," wherein we could discover what it's worth paying people to stay off

the roads so that we needn't build and mend them so much and suffer delays and pollution. Congestion pricing, zoning reforms, parking feebates, pay-at-the-pump car insurance, commuting-efficient mortgages, and a host of other innovations beckon state, local, and corporate experimenters. Yet unless basic and comprehensive transport and land-use reforms emerge in parallel with hypercars, cars may become apparently benign before we've gotten good enough at not needing to drive them—and may thus derail the reformers.

If the technical and market logic sketched here is anywhere near right, we are all about to embark on one of the greatest adventures in industrial history. Whether we will also have the wisdom to build a society worth driving in—one built around people, not cars—remains a greater challenge. As T. S. Eliot warned, "A thousand policemen directing the traffic / Cannot tell you why you come or where you go." ☼

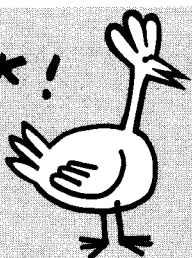
BEYOND EFFICIENCY

BY MARK DERR

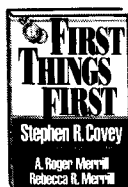
*Even if lighter, durable,
more efficient cars eventually replace
those now in use, a long-term solution
to overcrowded highways and an
auto-centered culture will require
imaginative transportation and
urban-planning options. Several
are already in place, with
more to come*

MANY engineers agree that the ultralight hybrid vehicles described in "Reinventing the Wheels" are the best available alternative, technologically speaking, to the problems posed by the internal-combustion engine. But even if ultralight hybrids were the only cars on the road, traffic would continue to clog arteries in cities and suburbs. Many vehicle designers, including Paul MacCready, an internationally known inventor and the head of AeroVironment, an engineering firm based in Monrovia, California, which has developed innovative vehicles ranging from electric and solar cars to human-powered aircraft, anticipate the widespread use of low-speed "subcars" for local solo trips to the store, school, a transit station, or work. Usually under five miles in length, such trips account for 19 percent of U.S. automobile mileage and a considerably higher

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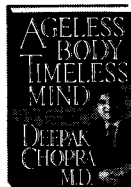
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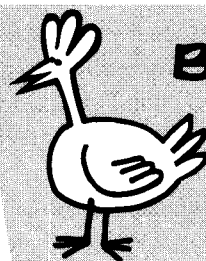
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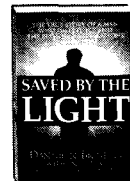
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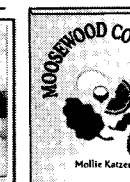
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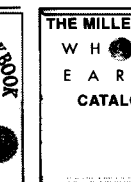
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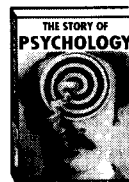
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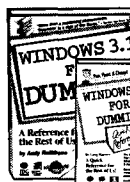
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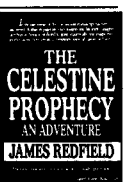
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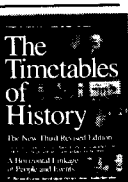
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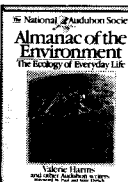
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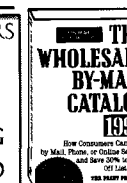
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percentage of emissions and energy use, because of the inefficiency of cold engines and stop-and-go driving.

Broadly defined, a "subcar" is any road vehicle that does not meet the U.S. Motor Vehicle Safety Standards for conventional cars, usually owing to its weight, number of wheels, or propulsion and braking systems. Practically, that can mean anything from a standard bicycle or pedal-powered rickshaw, to a motorscooter, motorcycle, or moped, to an electric tricycle or fancy golf cart. Many such vehicles are in operation in Third World countries, where they share the road with everything from animal carts to heavy trucks and contribute to traffic problems as nightmarish as those in Miami, New York, or Los Angeles.

Bicycles and their derivatives—promoted during the energy-conscious 1970s, derided in the 1980s when muscle cars made their comeback, and now perceived as a key to cleaning up the transportation mess—are receiving increasing attention in the United States. The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA, pronounced "ice tea") set aside a small but significant percentage of the total federal transportation budget for such "enhancements" as bicycle routes, and required each state to hire a coordinator of bicycling and pedestrian transportation. Polls reveal that as many as a quarter of those surveyed would ride to work if they were assured of safe bike lanes, secure storage, and showers, and if the price of gas rose to two dollars a gallon. Where cities and employers have met at least some of those conditions, they have produced results. Palo Alto, California, has an ordinance mandating that new commercial buildings of more than 10,000 square feet offer a shower and bike lockers. Boulder, Colorado; Davis, California; and Eugene, Oregon, are renowned among college towns for being bicycle-friendly, offering extensive bike paths and parking facilities. Among larger cities, Seattle takes first prize in the alternative-transportation sweepstakes, spending up to \$5 million a year on its bicycle lanes. In most communities, however, bicycle parking is inadequate and office buildings lack shower facilities. Most bike lanes fail to meet a recommended standard of fourteen feet in width; they cross busy intersections without safeguards; and they proceed by indirection to no particular destination.

New types of subcars expand the range, power, and utility of bicycles while reducing traffic congestion and pollution. They represent a meeting of high-technology aerospace research and the equally sophisticated toys of the human-powered-vehicle movement—bicycles, boats, and planes built for efficiency and speed, and solar cars. At the AeroVironment plant, in Monrovia, engineers are proceeding with several subcar projects, including electric-assisted bicycles and electric mini-cycles now being tested by employees and community volunteers.

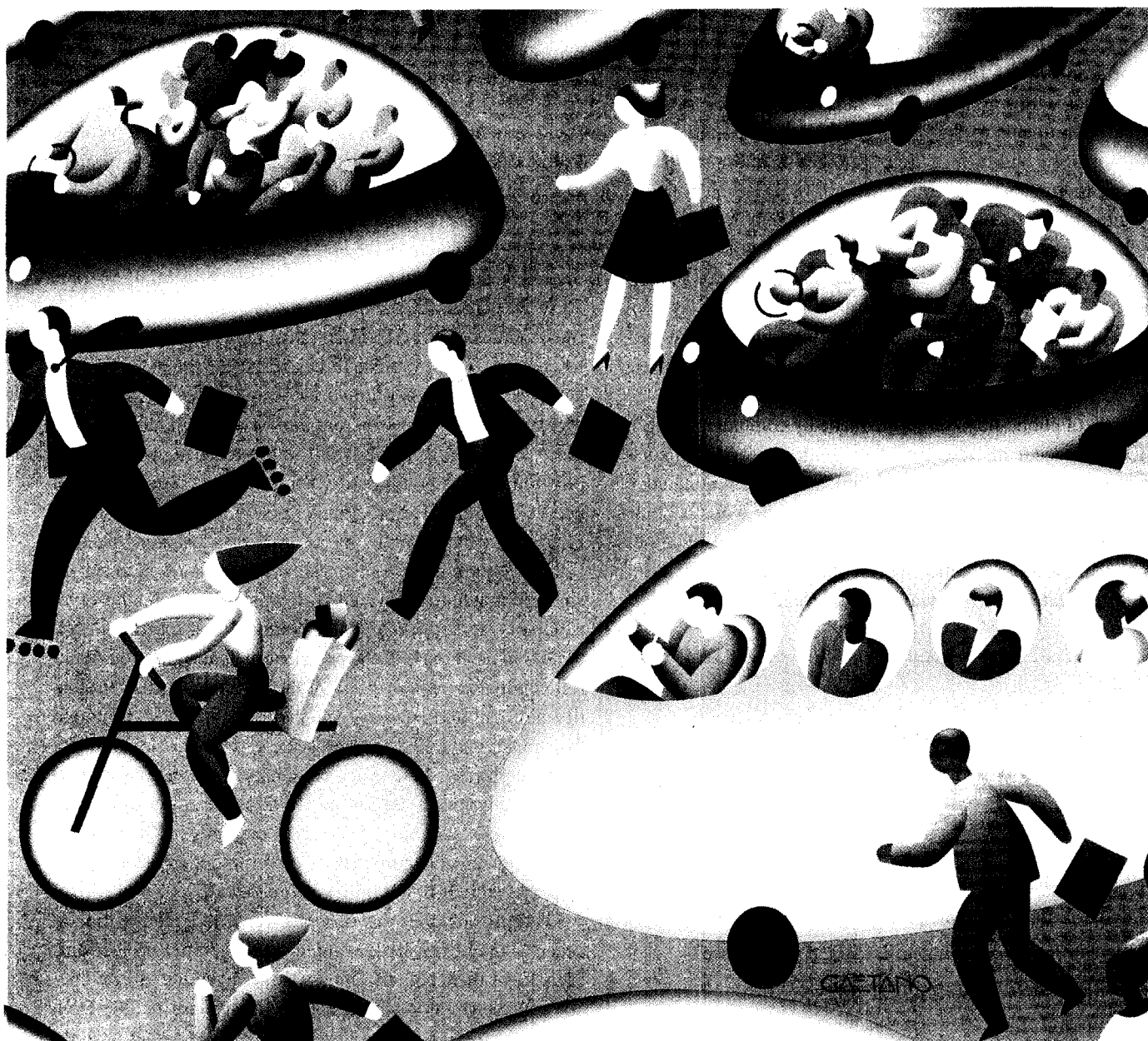
The vehicle designer Andrew Frank, of the University of California at Davis, has teamed up with Richard Bradford, of Lawrence Livermore National Laboratory, to design a



three-wheeled, fully enclosed aerodynamic vehicle that could function as a recumbent bicycle or accommodate a small battery- or flywheel-powered motor. The vehicle would have a small trunk and would feature ventilation and a temperature control for the seat, if nothing else. With the rear wheels set close together, it would approximate the maneuverability and handling of a two-wheeled bicycle, but would have better stability.

"These vehicles have to be approached seriously as a possible form of transportation for this country," Frank says. "This technology may also be useful in Third World countries, because we are looking at a cost of one to two thousand dollars." The tricycle would be designed so that a person of average size and fitness could easily power it. Its aerodynamic shell would be designed to bounce off another object in a collision, rather than crumple.

But no bike or bike hybrid has a chance in a collision with



a truck or a large car, and subcars will catch on only if the road system is adapted to accommodate them. "Safety is central," Frank says. "The automobile has evolved to be a very safe form of transportation. The message is clear that we have to have a change in infrastructure to make this happen. We must separate low-speed, lightweight human-powered vehicles from cars."

Frank envisions an infrastructure for his hybrids that would include elevated lanes and "flyovers" at intersections or freeways. Similarly, he has recommended designing extra signals at traffic circles and intersections which would allow bicycles, hybrids, and pedestrians to move in all directions, independent of other vehicles. The key is to adapt existing roads wherever possible, rather than to engage in expensive construction of parallel systems.

"On busy roads you can have separate lanes for bicycles and pedestrians," says Michael Replogle, a codirector of the

Environmental Defense Fund's Transportation Project, who has studied transportation around the world. "Elsewhere you can slow cars—'calm traffic'—so that you can welcome pedestrians and bicycles." He also recommends extending sidewalks across streets, so that cars have to adjust to pedestrians, rather than the other way around. If a sidewalk crossed the road at its standard elevation and had slightly rounded curbs, cars would have to drive over it as if it were a speed bump.

RECLAIMING THE CITY

THE emphasis that many transportation planners place on bicycles, subcars, and walking has its roots in a desire to reclaim urban and suburban spaces for the citizenry. Planners, officials, and motorists have come up with a variety of ways to do this. Too often the worst of these

have been put into practice while the best have languished for lack of glamour. Municipalities have chosen to put their efforts and funds into subways and light-rail commuter trains that with few exceptions can be classed as follies—grand monuments to the power of the public dollar, and to the nostalgia value of trains. Yet they remain hot items among politicians: some forty cities have proposals for such systems before the Federal Transit Administration, and the budget for fiscal 1995 includes \$4.6 billion for mass transit.

Martin Wachs, a professor of urban planning at the University of California at Los Angeles, observed at a 1992 symposium on southern-California transportation options that during the 1980s public transit's share of all trips dropped, falling to two percent in 1990, the lowest level on record. Although the bulk of public-transit trips are made by commuters, half of such trips occur in New York City, with Chicago, Philadelphia, and Boston contributing significantly to the remainder. More Americans walk or bike to their jobs or work at home than use public transit, leading reformers to ask whether public funds are not better spent building infrastructure, including a data superhighway, to encourage those activities.

"I HARDLY DREAM OF ANYONE WHO IS STILL ALIVE"

(for William Matthews)

Red Auerbach fumed into my sleep last night
at my late grandmother's Upper West Side apartment
along with John Berryman, each to argue the practice
of a delicate craft. John Paul II prepared pasta.
What a party! Night after night such visitations!
Execrable, some of them, betrayals that seem
centuries old. A shrink in a Land Rover,
pipe clenched in his teeth, glares out over
the heaped cadavers of a flock of sacrificed lambs;
a senator's sherry bottle tumbles out of his briefcase;
and, skittering from bush to bush, my father,
concealing filthied underwear behind his body,
stumbles his way to the shelter of the guesthouse.

Shame, this is your sting, these are your victims;
and all the years of striving to forget
cannot erase the presence of the dead,
every wrinkled face of which is mine.

—PETER DAVISON

In recent years the absolute number of riders has remained steady, while the percentage of trips made on public transportation has fallen. This phenomenon has occurred, Wachs says, "despite federal, state, and local spending on new rapid-transit systems in Washington, Baltimore, Miami, Portland, Sacramento, San Jose, San Diego, and, of course, Los Angeles and elsewhere, and continued expansion of the nation's bus transit system." During the same period the percentage of trips out of the home for the purpose of commuting fell steadily, so that today the category accounts for only 25 to 30 percent of the total. As noncommuting trips grew, traffic patterns shifted and congestion became a problem no longer confined to rush hours. Despite these wholesale changes, officials continued to design transit systems and regulations with the principal aim of cutting solo commuting. "This country is wedded to high-tech, high-cost, complicated solutions coupled with punitive programs to get people out of their cars," Frank says, "rather than to designing systems that provide the mobility they want and need."

That the premises transit planners have so long used are shaky has been confirmed by Don H. Pickrell, the chief economist at the John A. Volpe National Transportation Systems Center of the U.S. Department of Transportation. Pickrell conducted a major study of the assumptions used to justify new rail and subway systems in eight cities and found that transit use failed to approach the projected level in any of these places. Many of the passengers had previously used buses. He writes in the Spring, 1992, issue of the *Journal of the American Planning Association* that only in Washington, D.C., with its concentration of government jobs, did ridership exceed half of the initial estimate.

Pickrell concludes that officials were more than willing to accept—may even have wanted—exaggerated projections, because of their belief in the "elusive mystique" of rail, according to which it would automatically lure people from cars; their belief that only a costly transit system would make theirs a "world-class" city; and the availability of federal and state funds for such major public-works projects, which translate into local jobs and profits.

The sleek and clean 4.4-mile Red Line in Los Angeles, which opened in January of 1993, represents the full embodiment of the subway pork-barrel mentality while also revealing its bankruptcy. At a cost of \$1.45 billion, the Red Line was constructed as part of a grandiose thirty-year plan to build 22.7 miles of subway and 400 miles of light rail, along with lanes for high-occupancy vehicles, an improved bus network, and an advanced-technology system for tracking and directing traffic. Planners estimated that when the project was completed, a quarter of all Angelenos would live and 29 percent would work within half a mile of a rail line. They also estimated that 19 percent of all trips in Los Angeles County would be on public transit—hardly an inspiring number for the money.

Initially projected to cost \$183 billion and to create 1.4

million jobs in L.A. (although, if the past is a guide, few would have gone to those most in need of work), the entire scheme was criticized from the start as being too costly and based on wrong assumptions. Critics pointed out that in addition to their capital costs, the L.A. lines, like those in other cities, would require heavy operating subsidies and high expenditures for police protection—to make them safe for white-collar commuters worried about crime.

But in the two years since the Red Line opened, the continuing economic recession in southern California has combined with a ridership below projections and a major construction scandal—work on a new subway tunnel has caused sections of Hollywood Boulevard to sink—to force officials to scrap the thirty-year plan. The crisis is severe, according to Judith Wilson, the executive officer for planning and programming for the Los Angeles County Metropolitan Transportation Authority. The initial plan assumed that \$100 billion would be available in the first twenty years; now the figure is \$64 billion. As a result, planners have gone back to the drawing board in an attempt to find creative ways to serve a metropolitan area projected to grow by three million people over the next two decades.

Wilson says that previous transportation planning in Los Angeles has lacked technical rigor, but now everything must be re-evaluated and reviewed, including the commitment to rail. “There are places you will need rail,” she says, “but not universally. We’ll look at buses and all other options. We’re the trustees for the next generation, and we want to be sure we commit resources the best way we can.” To be released early this year, the new L.A. plan may represent an imaginative leap forward in transit planning, a break with the rigid thinking of the past, which has cost the public money with scant return.

Some sixty years ago the automobile surpassed the train as the preferred mode of transportation for Americans, and many transit officials and train buffs will admit off the record that that ranking will probably never change. Even in rail-rich Europe, studies show that in England and France, two countries with extensive urban transit systems, city dwellers prefer to drive or walk, in that order.

The American subways and commuter rails that survive work where concentrations of jobs and people not only anchor the line but also can be found along its route. Even where this is true, retaining ridership is a struggle, and when the system is allowed to deteriorate, as it was in New York during the 1960s and 1970s, lost passengers are difficult to reclaim. Despite ten years of investment in stations and cars, ridership on the city’s subways averaged 2.74 million a day in 1992 (the last year for which figures are available), as compared with 3.45 million in 1970. Ridership on the New York Metropolitan Transportation Authority, which includes the New York City Transit Authority (buses and subways) and the Long Island, Hudson, Harlem, and New Haven commuter lines, stood at 4.3 million a day in 1992, down from 4.8 million in 1980.

The migration of people and jobs to the suburbs and Sunbelt cities during the past four decades has contributed to the decline of public transit in New York and other older industrial cities and to the difficulty of building new systems. For example, in Chicago 20 percent of the jobs were in the ring suburbs forty years ago; today 60 percent are there, and the number still grows. Many employers have moved from major metropolitan areas to smaller cities in less developed parts of the country, to escape congestion, the high cost of housing and labor, and taxes. “Mass transit was created to resolve crowding in cities in the late nineteenth century,” Andrew Frank says. “In this country we have constructed a low-density society. Planners are wrong to want to re-create a nineteenth-century society.”

Planners and politicians, including many who recognize that mass-transit systems are not cost-effective, argue that commuter rail helps municipalities meet the requirements of the Federal Clean Air Act Amendments of 1990. These mandate that about twenty of the nation’s most polluted metropolitan areas implement “transportation control measures” to force people out of their cars. The measures include increasing tolls and parking charges and establishing automobile-free zones. The act also follows California’s lead in requiring employment sites with more than a hundred workers in the most befouled of the polluted urban areas to reduce the number of cars in their parking lots by fixed amounts.

ALTERNATIVES TO TRAINS

AGROWING body of evidence suggests that urban transit resources now devoted to rail would be more effective if applied to such low-tech alternatives as buses, vans, and car pools, with freeway lanes for all of them, and bicycles and subcars. Martin Wachs believes that a variety of options must be developed, including vans, to provide the sort of safe, timely, and flexible system that would reflect contemporary travel patterns.

Robert Cervero, a professor of planning at the University of California at Berkeley, reported in *PTI Journal* in 1990 that Bellevue, Washington, and Post Oak, Texas, the nation’s “two densest suburban workplaces,” had achieved remarkable success in weaning commuters from their cars without relying on rail. In Bellevue 27 percent of workers used a bus, car pool, or van pool to get to work. In Post Oak 22 percent rode in car pools and van pools. Bellevue’s zoning strictly limited the number of parking spaces that a building was allowed, and Post Oak benefited from Houston’s excellent high-occupancy-vehicle network. Various other surveys have shown that commuter vans are the most energy-efficient form of travel, except for human power.

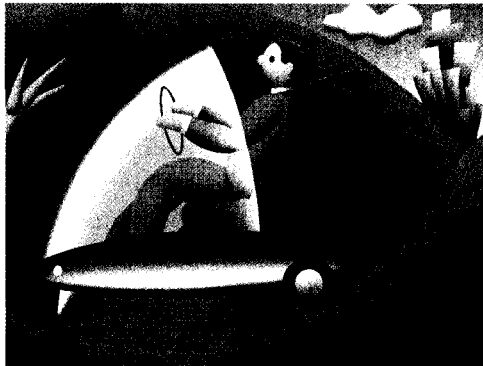
In the past few years in Miami, New York, and other cities, private jitney, or van, services have begun to put a

dent in the public-transit business, because they are faster and more responsive than buses. Transit authorities have responded to the competition not with innovative programs but with campaigns to ban the upstarts, on the grounds that they are illegal and unsafe. A better-established enterprise, Super-Shuttle, offers rides from airport terminals to private homes, hotels, and offices in southern California, San Francisco, Phoenix, Dallas, Miami, Philadelphia, and Baltimore-Washington, and is expanding rapidly.

Imaginative transportation planners foresee transit systems that would employ vans and buses of variable sizes—

facilities by an order of magnitude—a factor of ten—to get congestion down.” As a more economical, easier solution to overcrowded highways, Frank has conceived of customized tractor-trailer frames that would carry up to 20,000 cars and subcars per hour per lane on the typical Los Angeles freeway, as compared with the current maximum of 2,000 cars.

Frank’s “car-bus” would operate like a freeway ferry, carrying vehicles, their drivers, and passengers. More-elaborate versions for long hauls—from L.A. to San Francisco, for example—would be equipped with climate control and other



Nearly everyone concerned with solving the social, economic, and environmental problems posed by the automobile recognizes that advances in technology and public transit are no panacea.

from the now-standard forty feet to twenty-five feet or less—with flexible schedules and routes. In the near future such vehicles might run partly on electric power. And they would carry computers linked to central dispatchers who would direct the vehicles to clearly defined off-road stops where passengers who had reserved their seats by phone or computer modem were waiting. Computerized navigational and guidance devices would allow vans to form convoys for high-speed travel along the freeway.

Some of these technologies are currently being tested, and others are being developed, for the Intelligent Vehicle Highway System (IVHS), a several-hundred-billion-dollar program, involving private industry and the federal government, to minimize congestion and maximize the flow of vehicles on the nation’s highways. The program seeks, among other things, to allow vehicles to travel close together at high speed under the guidance of a control system. The highways themselves are to be monitored and wired to convey information about traffic conditions and accidents.

But many supporters of public transit dispute the potential of IVHS, arguing that it is simply an attempt to squeeze more capacity out of existing roads. “The big money is on IVHS,” says Rick Chellman, a New Hampshire transportation consultant developing a new text on street design for the Institute of Transportation Engineers. “But it is essentially a high-tech way of styling hair when the patient is dying of cancer.”

Andrew Frank says that IVHS technology can at best double capacity, whereas it is necessary “to increase use of

amenities. Drivers would reserve space ahead of time and then proceed to loading stations built beside or within existing interchanges. Fully automated, the stations would funnel cars into a series of bays perpendicular to the oncoming trailer. Once the ferry arrived, an entire line would be shunted onto it in ten seconds.

The “bus” Frank has designed for bikes and motorcycles would be about 100 feet long and would carry eighty passengers and vehicles. It would operate like the one for cars. The buses for cars would have varying capacity. All would be able to travel in existing lanes in close proximity at high speeds. Linking them together in trains would further increase capacity. Frank has described his system in various journals, but it has yet to be built. Perhaps because it bridges the gap between public transit and the private car, because it is at once simple and sophisticated, and because it dares to posit that cars, too, can become a form of mass transit, Frank’s idea has received interested nods—but no action. “L.A. transportation planners thought it was a great idea,” Frank says. “But it wasn’t *their* idea.”

LAND USE

NEARLY everyone concerned with solving the considerable social, economic, and environmental problems posed by the automobile soon recognizes that advances in technology and public transit are no panacea. Even if all existing cars were to become nonpolluting vehicles overnight, enormous problems would remain in terms of congestion and the dislocation of social

and family life. The underlying land-use and zoning policies that are at once products and creators of the car culture must also be altered.

"Transportation and land-use problems are a failure of the market," says Michael Replogle, who was formerly the transit coordinator for Montgomery County, Maryland. "We have allowed large hidden subsidies to dictate land-use and development patterns. Traffic engineers have destroyed grids and funneled roads into major arteries, which limit walking. Separating land uses into nothing but houses or nothing but shops, so that the vast majority of people have no option but to use a car, hurts small-business formation by not allowing business near neighborhoods."

The Miami-based architects Andres Duany and Elizabeth Plater-Zyberk have established an international reputation for innovative urban designs—most notably the design of Seaside, in the Florida Panhandle—that create a sense of community with short blocks, mixed land use, and pedestrian paths and sidewalks. "We want to tempt people out of their cars," Duany explains. But the goal is to make the car accommodate itself to pedestrians, not to ban it completely. "Cars provide for street life," he says. "Cars provide energy and vitality—that is, cars moving slowly and safely."

Communities that follow the principles of Duany and Plater-Zyberk and other innovative urban planners are springing up around the country. But it is easier to construct a new community than to redesign an old one. "Retrofitting existing suburbs is made difficult by land-ownership patterns," Rick Chellman says.

Still, some suburbs at least seem suitable for reform. Robert Cervero, of Berkeley, has suggested that so-called edge cities, or "megacenters," such as Tyson's Corner, in the Washington, D.C., suburbs, and Las Colinas, outside Dallas, are "ideal building blocks for designing integrated networks of transit centers in the suburbs," because of their density and mixed land use, which make them resemble traditional downtowns.

Another approach focuses on reversing sprawl by redeveloping urban cores and even older suburbs, a process called "redensification." Trying to halt some of the suburbanization that is reaching into forests and farms on Seattle's outskirts, civic and business leaders in that city have proposed the creation of an urban village, Seattle Commons, on 470 acres that are currently a dilapidated warehouse district. With a large park, a marina, and a mixture of housing, businesses, and schools, the urban village would offer residents the possibility of living car-free.

To succeed, these and other projects must overcome the fear that many Americans have that high-density development equals crime and an assault on their property values

and way of life (and never mind if that way of life causes them to complain about traffic congestion, noise, and air pollution). Cervero and other experts argue that local and state governments must employ a variety of tools to encourage change, among them tax and zoning incentives to level the price differential between rural and developed land; variable toll rates and impact fees to control automobile congestion; and an infrastructure for walking, bicycling, or taking responsive, clean vans and buses. The denser settlements must offer amenities that are not found in the sprawling suburbs.

Deborah Gordon, of the Union of Concerned Scientists, asserts in her book, *Steering a New Course*, that transportation and land-use planning, if it is to succeed, must be conducted regionally with the full participation of local communities. Planners have known that for a quarter of a century, but efforts first to establish and then to strengthen regional bodies with more than specialized authority have proceeded slowly. Local leaders are reluctant to share their power, and so they end up serving their constituents poorly.

But Cervero cautions that new approaches will have an effect only if motorists have to pay the true cost of car ownership directly. "Until we take on the hard issue of pricing for the automobile," he says, "we won't have anything change. The subsidies are so great that nothing can happen."

WHERE THE ROAD TURNS

PREDICTING the future is a fool's game, because the future obeys no blueprint, no matter how elaborate. Nonetheless, decisions made and unmade today play a role in determining the shape of our society, or even our individual lives, tomorrow. Paul MacCready says that we must take control of technology—"storm the bridge of the *Titanic*"—by setting goals to produce economical, energy-efficient vehicles and then dealing with issues relating to the reasons people drive and, more fundamentally, to the effects of an ever exploding human population on the world's resources and creatures.

Transportation's contribution can come from integrating a family of technologically advanced vehicles with substitutes for automobile travel—telecommunications, flexible and reliable public transit, car and van pools, varied work schedules and habits, and an improved infrastructure for subcars and pedestrians. The decision is no more radical than one taken nearly forty years ago to create a culture dedicated to the car and linked nationally by a 45,500-mile ribbon of concrete and asphalt. The interstate highway system has transformed the landscape. A comprehensive new approach to transportation will give it a more humane face. ☛



Built Pieces

*Like Igor Stravinsky, Duke Ellington
was a brilliant assembler of
other people's music*

THE relationship between jazz and "serious" music has been a touchy subject for seventy years. Critics have portrayed jazz as either a primitive folk music or the real classical music of this century. Throughout his life Duke Ellington found himself right in the middle of this controversy. He played his music at the Cotton Club and at Carnegie Hall. Where did it belong? The true home for Ellington's music has yet to be determined, but a steady outpouring of new recordings and criticism allows us to achieve a fresh view of his vast legacy.

by David Schiff

Mark Tucker's *Duke Ellington Reader* (1993)—a 500-page anthology of writings about the Duke, the contents of which are illuminating, sobering, maddening, and occasionally inspiring—documents a mixed history of appreciation and incomprehension behind the current movement to elevate Ellington to the highest ranks of twentieth-century composers. This status is assumed by the Smithsonian Institution in its exhibition "Beyond Category: The Musical Genius of Duke Ellington," which is in the midst of a three-year tour of the country, and in

a pedestrian 1993 biography by the curator of the exhibit, John Edward Hasse.

The Smithsonian acquired a huge collection of Ellington material from the composer's family in 1988. It should keep musicologists busy for the next several centuries. Neither the exhibit, which seems aimed at the very young, nor Hasse's biography, which reads like a coffeetable book, reveals any surprising new insights into the man or the music. No matter: the music is what counts, and with every passing month new Ellington CDs appear, covering his entire recording career, from 1923 to 1973.

Yet despite the musical evidence, Ellington remains controversial. In his 1987 biography of Ellington the curmudgeonly critic James Lincoln Collier raised the question of whether Ellington should be considered a composer at all, on the grounds that he "rarely wrote out a composition in complete form" and that so many of the works were composed collaboratively. In his biography Hasse questions Collier's evaluation of Ellington. But Hasse does lend considerable

substance to the charge that many of Ellington's compositions were in fact written by or with others—a situation not always accurately reflected in the copyright.

The who-wrote-what question is, however, a red herring. None of the musicians with whom Ellington composed—not Bubber Miley, not Johnny Hodges, not Juan Tizol, and not even Billy Strayhorn, Ellington's classically trained, musically distinctive alter ego—produced significant music when separated from him. Ellington had a genius for making music out of other people's music.

ELLINGTON was an assembler. His band and his compositions were collections of instrumental colors and musical styles brought together by his guiding sensibility. Although he created many original melodies from distinctively chromatic and wide-leaping lines (as in "I Got It Bad" and "Prelude to a Kiss"), and was arguably the most advanced jazz harmonist of his time, he constructed many of his pieces with familiar phrase units, which gained new meaning through surprising juxtapositions. Many Ellington pieces incorporate bits of blues, harmonic progressions based on ancient jazz like "Tiger Rag," tune structures from Broadway standards, and actual melodies from other people's songs. These allusions and transformations were not criminal acts of plagiarism; they were a compositional method.

Once we view Ellington in this light, we can place him head to head with the other great musical pickpocket and assembler of twentieth-century music: Igor Stravinsky. After all, both composers turned Chopin's Funeral March to their own ends (compare the beginning of Stravinsky's Piano Concerto with the end of "Black and Tan Fantasy"), and both dared to reharmonize "The Star-Spangled Banner" and recompose large chunks of Tchaikovsky. And each relied on a close collaborator—Strayhorn for Ellington, Robert Craft for Stravinsky—to function as a composer. Most important, both were able to transform almost any available musical material through the power of an instantly recognizable style.

Some music grows like a plant from a seed, gradually evolving toward its ultimate goal—call it organic. Other music

sounds pasted together and shows its joins—call it cubist. And some music seems to express a timeless perfection—call it geometric. Geometric form is rarer in a medium as provisional as jazz, but you can hear it in such well-polished pieces as Art Tatum's "Willow Weep for Me" and Fletcher Henderson's "Down South Camp Meeting," that anthem of the swing era. Listening to a Sonny Rollins solo, in contrast, we hear an idea gradually unfold and build, often over many choruses.

Ellington's music is different—more compact and contrived than Rollins's, less stable than Henderson's. Listen to "Harlem Airshaft" (1940) after "Down South Camp Meeting." They belong to the same up-tempo genre, and yet the Ellington composition sounds more complicated, dense, and disorienting. Both pieces are in three sections. In the Henderson the outer sections create an architectural balance, a symmetrical frame for the main tune. Ellington begins "Harlem Airshaft" with several short, disconnected phrases, each in a different key, which forecast the different musical ideas to come. This rapidly cross-cut sneak preview sets up the final chorus, which superimposes the three ideas of the piece. From beginning to end the musical themes—all of them swing-era commonplaces of no particular originality—appear in a state of active contrast, not static balance. If Henderson's piece is pure swing, Ellington's is second-degree swing—swing about swing.

Yet at the same time, Ellington's tour de force of counterpoint and structure is a pure jazz composition, a typical "I Got Rhythm" spinoff so unassuming in its ingenuity that some critics, including Gunther Schuller, dismiss it as not much more than a series of clichéd riffs. To make complexity seem effortless is the hallmark of a great stylist. Ellington's music is as elegantly put together as were his suits, shirts, and ties—and his stage persona. (Stravinsky was also quite a dresser.)

ELLINGTON'S orchestra was, uniquely, an ensemble of individuals. Its distinctive sonority began with the 1920s "jungle style" of Bubber Miley's plunger-muted trumpet, which was soon confirmed by the growl and plunger sound of Joe "Tricky Sam" Nanton's

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trombone and then amplified by Harry Carney's baritone sax. The three components of the jungle style come together in "East St. Louis Toodle-Oo," with its distinctive blend of sass and pathos. Significantly, the sound of the piece as a whole comes from a blending of idiosyncratic personal styles and instruments from different choirs. At the time it appeared, in 1926, it sounded like no other jazz.

The jungle style, with (for better or worse) its Cotton Club associations, would make Ellington famous, but he soon introduced very different elements into his band—namely, two performers whose style derived from Sidney Bechet, the master of blues inflections whom Ellington later called "the foundation." Johnny Hodges and Barney Bigard brought a sensuousness to the band through their liquid arabesques of sound and continuous bending of pitch, which counteracted the rough gutbucket quality of Bubber Miley (and later Cootie Williams), Joe Nanton, and Harry Carney. This contrast might have given another band an identity crisis. For Ellington it became a principle that he pursued further: by 1940 the sound of the band was built of sharply contrasting sonorities within each instrumental section.

Ellington's precise command of individual colors within his orchestra recalls Rimski-Korsakov's principle that an orchestrator should assign melodies only to instruments uniquely equipped in register and tone color to play them—a principle perfected by Ravel and Stravinsky. Ellington applied this idea not just to instruments but to specific performers: in his scores he assigned lines by name of player rather than of instrument. This approach had a drawback, in that it left the repertoire of the band exposed to changes in personnel. Between the start of the famous Ben Webster–Jimmy Blanton recordings of 1940 and 1941 and the 1943 Carnegie Hall concert, Cootie Williams and Barney Bigard left the band, and Blanton, whose bass playing transformed its rhythmic feeling, died tragically at the age of twenty-three. It was to be another decade before Ellington's orchestra achieved a recognizable and stable cast of players.

To some critics the dispersal of the "classic" 1940 band marked the end of Ellington's significant contribution to jazz. I think they undervalue the plea-

tures provided by the Ellington band of the fifties, which featured the heady gin-and-dry-vermouth mixture of Jimmy Hamilton's classical-style clarinet, Clark Terry's whimsical flügelhorn, and Ray Nance's sinuous violin. But then, I have always had a fondness for the artsy, even louche, side of Ellington, which made many of his critics uneasy.

By the sixties Ellington had turned his personnel problems into a strength by recording with musicians outside his band such as Ella Fitzgerald, Louis Armstrong, Coleman Hawkins, Charles Mingus, and John Coltrane. Now all of jazz history became, in effect, his band. In this series of collaborative recordings Ellington assembled a jazz canon thirty years before the notion of classic jazz. (The ultimate collaboration—the joint recording of the Basie and Ellington orchestras made in 1961—reveals an unintended historical irony: by the time the two bands met, they had lost their individuality to such an extent that they seemed indistinguishable.) In 1963 Ellington created one of the first classic big-band anthologies with *Recollections of the Big Band Era*, a recording that combines reverent reconstructions of charts by Henderson and Sy Oliver with savage deconstructions of Guy Lombardo, Stan Kenton, and George Gershwin. I doubt that any of today's jazz-repertoire orchestras would allow themselves such creative liberties—but then, as Stravinsky said when he was criticized for rewriting Pergolesi, Tchaikovsky, and Gesualdo: "You respect but I love."

JAZZ rarely confronts us with the temporal anxiety on which so much classical music depends. In most jazz performances the form is simply a repeated harmonic framework within which improvisation can happen. Where the large classical forms create interest by postponing events in order to establish a sense of arrival, jazz usually delivers its goods "in the moment," in the music critic Francis Davis's phrase. Sitting in a club, we listen to an open-ended series of choruses, happy to be present when a great soloist has time to stretch out.

Historically, however, there are two unrelated sources of a more articulated jazz form: the lingering influence of ragtime and the three-minute playing time of the 78-rpm record. The ragtime form

stemmed from "Stars and Stripes Forever" and similar popular marches, which were built in parade style, usually from three different tunes, the most memorable saved for last. Many of Scott Joplin's rags followed a similar three-tune pattern, which persisted in jazz. Ellington showed less interest in adhering to the strict formal outlines of ragtime than in the larger idea of building a piece out of more or less dissimilar parts.

Ellington's formal mastery is no secret. The French jazz critic André Hodeir devoted twenty pages of heated existentialist prose to the formal design of *Concerto for Cootie*. (You can smell the Gauloise in a sentence like "*Concerto for Cootie* is a masterpiece because it shows the game being played for all it is worth, without anything's being held back, and because the game is won.") In the concerto we see Ellington the cubist at his most refined. In order to bring out different aspects of his trumpeter's style, Ellington assembles three elements: a call-and-response tune played with the mute, an eight-bar growled blues, and an exuberant Armstrong-style melody for the open horn. All are connected by short linking passages of two or three bars, which give the whole structure a flexible, sprung unpredictability.

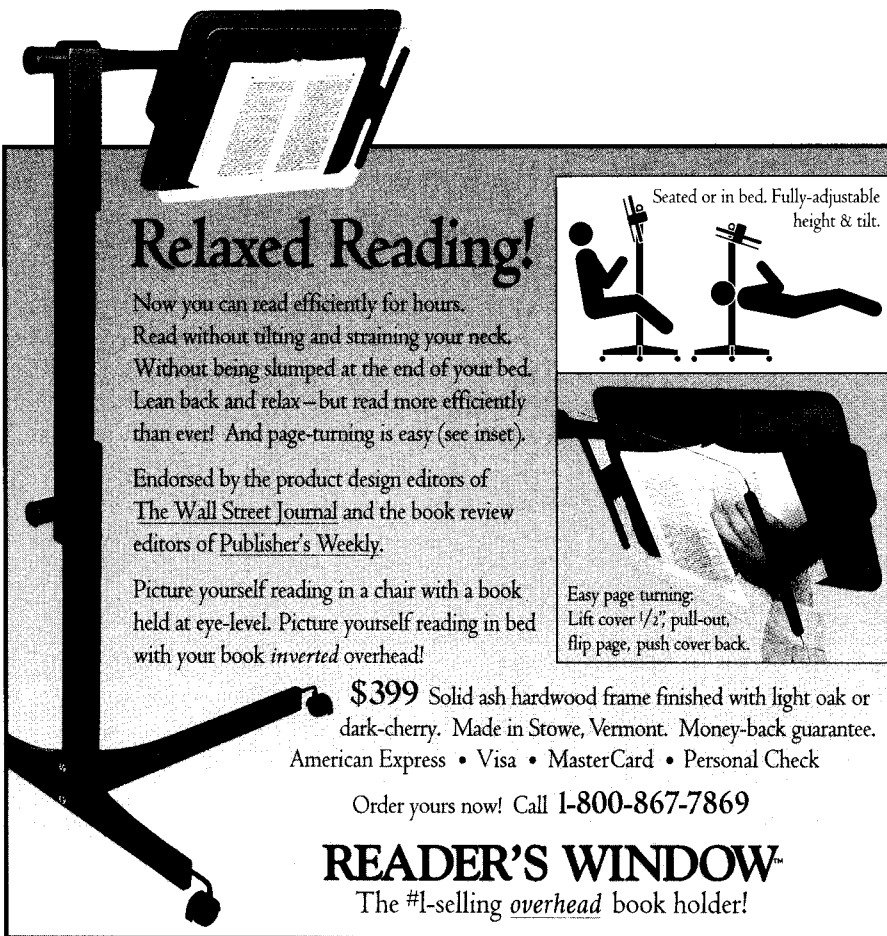
Even the arrival of a bona fide Kansas City slugger like Ben Webster did not deflect Ellington from his constructive experiments toward the looser approach of the Basie band. "Cotton Tail," a showcase for Webster and Ellington's nearest approach to Kansas City style, builds to an explosive frenzy through a calculated mixture of expectation and surprise. There are six statements of a standard "I Got Rhythm" structure, and five of them contain a land mine. After a series of increasingly energized swerves and surprises, the final phrase of the final chorus repeats the opening tune—just once, with no padding or extension—and then it's over. Stunned by the elegant succinctness of the conclusion, we can hear that the piece was a brilliant ruse: a battle royal between Webster's sax, which is amplified into the Supersax team of the fifth chorus, and the brass section, Ellington's loyal commandos. Guess who wins.

Although many critics honor Ellington as a creator of miniatures, or three-minute masterpieces, his extended works are more controversial. Critics of *Black*,

Brown and Beige, one of the longest of all his compositions, are nearly unanimous in blaming the music's failure on Ellington's allegedly defective formal sense. The piece, they say, is too long and too diffuse, and Ellington did not have the skills (that is, conservatory training) to sustain such a long structure.

Other composers, such as Gershwin and William Grant Still, did apply symphonic devices to jazz material, and the results are jazz-tinged symphonic music, not jazz. Ellington always composed his music from the formal resources of jazz as he understood them. He built his longer pieces, as he built his shorter ones, out of the four-, eight-, twelve-, and thirty-two-bar units of the blues and the standard popular song, though he frequently stretched these units by a bar or two and inserted short linking passages. There were no useful precedents for this kind of large structure, and so Ellington experimented with a number of different approaches to it. *Black, Brown and Beige* (1943) and *Harlem* (1951) combine the results of his previous formal research in richly articulated structures that are episodic yet intertwined—and that “tell a story.” The variety of Ellington's formal devices amply proves that he did not suffer from a lack of conservatory training in form any more than in orchestration, another supposedly arcane field.

ELLINGTON'S creative career, like Stravinsky's and Beethoven's, can be divided into three periods. The “late period” of all three composers was long viewed with suspicion. There are several simple explanations for the neglect of the later Ellington. With the rise of rock, he never produced a hit tune after “Satin Doll” (1953)—much to his dismay, for he counted on his pop-tune royalties to subsidize the band. Despite the lack of hit tunes, Ellington's late period was one of great fecundity and invention, ranging from a constant stream of pieces played once and forgotten to the pungently noir symphonic score for the film *Anatomy of a Murder*, the joyful, witty ballet music for *The River*, and the three Sacred Concerts, whose mixture of naiveté and the sublime may someday be heard in relation to *The Magic Flute*. Much of his late music took the form of suites written for festive premieres, sometimes in collaboration with Strayhorn, which cover a



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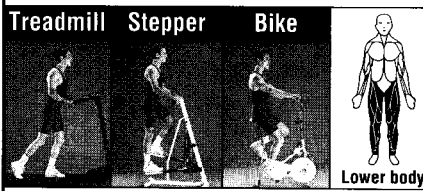
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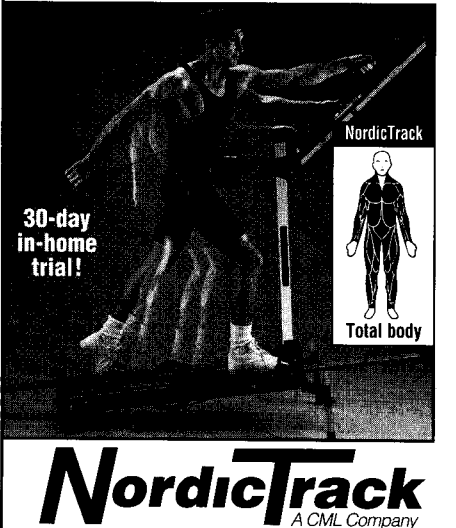
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huge amount of expressive territory. The earliest, the 1944 *Perfume Suite*, opened up an avenue of erotic speculation that would reach its fulfillment twenty years later in Charles Mingus's *The Black Saint and the Sinner Lady*.

If I had to single out one masterpiece from Ellington's late period—one to place alongside Stravinsky's *Agon*—my choice would be the *Shakespearean Suite*, otherwise known as *Such Sweet Thunder* (recently re-released on CD by Sony). Both these youthful works were completed in 1957, when Stravinsky was seventy-five and Ellington fifty-eight. Both are suites of short dances which take as their subject a world of the late Renaissance—French court ballet and Elizabethan theater, respectively—and evoke that world through the unmistakable styles of their composers. The works also invade each other's territory. *Agon* has several jazzy moments, particularly in the Bransle Double. Though Stravinsky rarely had anything good to say about jazz, and to my knowledge never even mentioned Ellington in his writings, he frequently made use of jazz figures, notably in the *Ebony Concerto*, written for Woody Herman, and *Symphony in Three Movements*, both of which appeared two years after *Black, Brown and Beige*.

Although *Such Sweet Thunder* is clearly Ellington-Strayhorn jazz, it trespasses boldly into the world of art music. Four of the movements are written as sonnets, following the fourteen-line iambic pentameter design of the poetic form—Stravinsky called this process of turning poetic meter into music, which he used in *Apollo*, "versification." Each of these sonnets gives an Ellington soloist a chance to speak through his instrument, thereby connecting the Elizabethan soliloquy with the talking-horn wa-wa technique perfected by Joe Nanton.

Three movements give us Shakespearean portraits within recognizable Ellington genres. Othello appears in the title number, a series of African-tinged blues choruses, jaunty yet mysterious, recalling "Ko-Ko." Cleopatra's barge is evoked by some Tizol-style exoticism in "Half the Fun," and in Billy Strayhorn's "Star-crossed Lovers," Romeo and Juliet receive the benediction of a lush Hodges ballad. Four other movements open up new territory. "Lady Mac"(beth) is a down-home ragtime waltz with a tricky

twenty-bar phrase structure that serves as a vehicle for a suave Clark Terry solo. "The Telecasters," according to the liner notes, represents the Three Witches (three trombones) and Iago (Harry Carney). While the programmatic premise may be tongue-in-cheek, its opposition of two dark colors demonstrates the principles of Ellingtonian counterpoint. But this is a warm-up act in contrapuntal acrobatics to "Up and Down, Up and Down," which compresses the entire story of *A Midsummer Night's Dream* into three event-packed minutes. If ever there was an Ellington composition that lived up to the phrase "beyond category," this is it. Then it goes even further: with "Madness in Great Ones" the Danish Prince turns up in a screech-trumpet mad scene that sounds like it could be the Art Ensemble of Chicago or Anthony Braxton some fifteen years later.

It seems almost too easy these days to say, with our saxophonist President, that jazz is "America's classical music." Although the phrase has a nice ring to it, it raises all sorts of questions (why classical? why American?) and then hides them under the flag. Even the impeccable Whitney Balliett recently termed Ives, Copland, and Barber "European apples" as opposed to that "American orange" Ellington—you can see Charles Ives's mouth foaming with Yankee rage. And I like to think that you can see Ellington himself shaking his head in dismay at the latest tyranny of category.

I've put Ellington head to head with Stravinsky not to set up a contest—would it matter who won?—but to suggest that the music of these two great twentieth-century composers can be talked about in the same terms and that when viewed from certain perspectives, the two men might have more in common with each other than with figures in their own traditions. As an assembler of music and a creative plunderer of the past, Stravinsky is closer to Ellington than he is to a more conventionally traditional and "sincere" composer like Rachmaninoff. As a musical architect and an alchemist of tone color, Ellington resembles Stravinsky more than he does an improvisational genius like John Coltrane. Both composers treated tradition as a field they were free to reshape—call it historical chutzpah. How's that for a category? ♫

Intellectual Warfare

The reviews of James Fallows's latest book are emblematic of our complacency about the nature and implications of Japan's economic strength

by Chalmers Johnson

**LOOKING AT THE SUN:
The Rise of the
New East Asian Economic
and Political System**

by James Fallows.
Pantheon, 517 pages,
\$25.00.

THE Cold War has now been over for five years, but there's been no real change in America's military pretensions. Less than three years remains before Hong Kong, the world's third largest financial center (after New York and London), is turned over to China. The English-language business press proclaims that the U.S. economy is strong and the Japanese economy weak, even though the Japanese save just under a fifth of their national income and the Americans save next to nothing. Japan's 1993 per capita income was \$36,615, as compared with the United States' \$24,075; Japan's 1993 current-account surplus was \$131.1 billion, while the current account deficit of the United States was \$105.7 billion; and Japan's economy is starting to revive as the headquarters for the East Asian manufacturing megalopolis, while the U.S. economy still depends primarily on domestic overconsumption. It will not be long before Americans will have to start paying premium interest rates to attract foreign savings to finance their self-indulgence. And there seems not to be a single American leader devoting one iota of attention to this situation.

Kenneth Courtis, the chief strategist for the Deutsche Bank in East Asia, in a recent essay called "Before the Storm," warned that this inattention to the trend of events is highly dangerous. I believe that it is caused by the grip of vested in-



terests perpetuating the Cold War system—a resistance to reality rivaling that of Brezhnev's Russia in its complacency and hostility to new information. There are many indications that we are artificially becalmed, trapped in the horse latitudes, and waiting for some incident to make the intrinsic situation extrinsic. Such an incident would reveal how the global balance of power has changed and how hollow our claims of being the unipolar superpower actually are.

The current drift of events suggests an extended version of France's *drôle de guerre*, which lasted from the declaration of war in September of 1939 until the ac-

tual arrival of the German armies in May of 1940. As was the case then, we are today in an eerie time, stranded in the inertia of Cold War relationships while we wait for the real contours of the new world order to emerge from the fog. Some people are preparing for the approaching storm; others do not want to think about it; a great many are trying to kill the meteorologists who are predicting it.

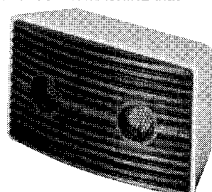
ONE example of the current intellectual warfare being waged is the reception given to James Fallows's *Looking at the Sun*, which was published last year. According to strict publishing standards, I

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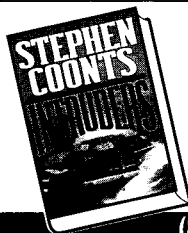
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should not be discussing Fallows's book and *The Atlantic* should not be publishing my remarks. Fallows is the Washington editor of this magazine, which published several excerpts from his book, the manuscript of which I read and vetted. I am indelibly linked with Fallows because we are both what the Japan lobby calls "revisionists"—that is, people who have had the temerity to "revise" orthodox theoretical pronouncements: either that since Japan is rich, it must have learned how to operate its economy from the Econ 101 courses taught in American universities, or that since Japanese economics do not fit the gospel according to Saint Adam Smith, Japan's economy is doomed to collapse any day now.

But the issue here is not the conventions of the publishing world but the biggest and most misunderstood event of the end of the twentieth century: the shift of the global economic center of gravity to the Western Pacific. The end of the Cold War has finally exposed to view something that the Cold War itself both fostered and camouflaged: the enrichment of Asia. How that happened and what it means for the future are the keys to the new world order.

JIM Fallows, a journalist with an Oxford degree in economics, is the author of *National Defense*, which won the National Book Award in 1981. Having heard about the enrichment of Asia, and being curious about the people who produced it, he took himself and his family to live there for four years. Fallows divided his time between Japan, the superpower of the region, and Malaysia, the richest of the platforms for Japanese manufacturing in Southeast Asia. His book does not deal with China or take Korea or Indonesia as seriously as it might have. But Fallows studied and wrote unerringly on the likely next entries into the category of miracle economies—Vietnam and perhaps Burma—and every American should read his chapter on the Philippines, since that country is the only part of Asia whose legacy is unambiguously ours. I know of no better contemporary guide than Fallows to the role of the ethnic Chinese in Southeast Asia, the historical underpinnings of Japan's state-guided capitalism, or the differences between the Thai and Malay outlooks on the world. But none of these aspects of his book has

surfaced in any of the savage attention it has received.

Instead Fallows has been excoriated for a "visceral hostility" to Japan (the *Los Angeles Times*), for being a "MITI lover" (The *Wall Street Journal*; the reference is to Japan's Ministry of International Trade and Industry, an economic-strategy agency that has guided Japan's postwar growth and is similar to the American Joint Chiefs of Staff), and for writing "a defective guide to what economics teaches about national development strategies and the functioning of modern industries" (The *New York Times*). The last reviewer acknowledges that he is "an infrequent Asian traveler" and that "laissez-faire theories fit the Asian experience badly," but he nevertheless cites an American economist from the 1880s—a time when the United States was one of the most heavily protected economies on earth—to the effect that Asia has nothing to teach us about economic growth. Writing in *The New Republic*, Ian Buruma declares Fallows to be a "neo-Orientalist," of the never-the-twain-shall-meet persuasion (Buruma actually quotes Kipling's bromide), and faults him for failing to understand that the Japanese machine politician Ichiro Ozawa really admires "British parliamentary democracy."

Buruma is an interesting case. A British-accented author of books about Japanese sexual fantasies, travel in Asia, cricket, and how the Germans have wept enough for their wartime deeds but the Japanese have not, Buruma really is innocent of the structure and properties of the Japanese economy. Nonetheless, *de haut en bas*, Buruma takes Fallows up on the subject of economics.

Even if we assume, for the sake of argument, that Fallows is absolutely right, that there is such a thing as a specifically Asian system, combining mercantilism with authoritarian politics, does this disprove the main case for classical economics? Ricardo and Smith said that nations benefit from keeping their markets open for trade, even if other nations keep their markets closed. Consumers benefit from cheaper products, and competition keeps producers efficient and quality-conscious. Fallows does not believe this. He thinks it is a dogma that blinds the Anglo-Saxon world to the reality of the East. This is why he thinks the United States should devise an indus-

trial strategy if it is not to follow Britain's giggling slide into the sea.

With the statement "Fallows does not believe this," Buruma begins to reveal that reviews of Fallows's book are not really book reviews at all but acts of faith—what the Inquisition called *autos-da-fé*—and are intended to warn the unsuspecting of possible heresy. This kind of warning disguised as criticism is becoming a regular, if subliminal, feature of discussions about Asian capitalism. Fallows is certainly not the first writer about the challenge of Asia to be savaged by reviewers and yet still be widely read. Michael Crichton was called politically incorrect, a Japan-basher, and a racist for writing his novel *Rising Sun*, about how a Japanese company seeking a share of the American microelectronics market bribed and blackmailed a U.S. senator—a fictional treatment of the daily occurrences Pat Choate detailed in *Agents of Influence*. It now looks as if Jeff Shear's excellent and revealing *The Keys to the Kingdom: The FS-X Deal and the Selling of America's Future to Japan* is to be accorded similar treatment. *The Wall Street Journal* has recently declared Shear to be a "New Mercantilist" who favors supporting high-tech industries in the United States. Shear's reviewer says this viewpoint is silly, because "countries don't compete in most business, businesses do" and "no trade [in the Pacific] is going to occur except win-win transactions."

The issue raised by Fallows is the possibility that the Japanese have put together the institutions of capitalism in a more effective way than is taught in English and American academies. He has also remembered what Adam Smith had to say about the functions of the state in market economies. Even the functions that Smith considered basic—appropriate education of the labor force, construction of the infrastructure on which manufacturing depends, the "night watchman" functions of guaranteeing public safety—our state fails to fulfill in a competitive manner. And Smith was interested in the minimalist state. The Japanese have shown the world that there are many things the state can do in a market economy in order to make it work well—things that never crossed Smith's mind or that would not have mattered in his eighteenth-century setting. These include the management of tech-

nology (the great variable that cancels "comparative advantage"), the management of the change of industrial structure (for example, from capital-intensive to knowledge-intensive industries), and the management of competition to ensure the availability of high-value-added jobs (for example, the making of computer chips instead of potato chips) for one's own citizens. When Fallows's critics intone that he fails "to recognize that the enemy was really us" (*New York Times*) and that "the Japanese people aren't so different from us after all" (*Wall Street Journal*), they are deliberately deflecting scrutiny from what Fallows actually says. His book is the most straightforward kind of call to action: the challenge of Asia, like the Cold War itself, requires acknowledgment of the challenge and policies to match it, not just incessant knocking on wood by vested interests fearful of change.

ECONOMICS has become the Marxism-Leninism of our society—the official ideological expression of how the United States works and why it "won" the Cold War. Its adepts, the professional economists of our society, have the same interest in preserving their usually tenured (in violation of market forces) positions as did the masters of ML at Moscow State University until August of 1991. The greatest single threat to their continued dominance is the prowess of the Japanese economy and the emulation of that economy by everybody else in Asia, from China to Kazakhstan. It is not the wealth of Asia that is threatening but how the Asians obtained it. Conventional U.S. economic theory says that the state cannot be effective in the economy. We believe this because of our own history of struggles against the state and because the ideology of the Cold War maintains that laissez-faire vanquished socialism. We also have practical evidence that our nonmilitary bureaucrats are often more expensive than they are effective. But the evidence from East Asia is overwhelming. Nonadversarial relations between the public and private sectors can produce safe, sane societies with astonishingly high levels of evenly distributed income. Our theorists must either dismiss this evidence or start thinking about the only choices left to them—retooling in the Japanese language (very hard to do after age thirty-five) or early retirement.

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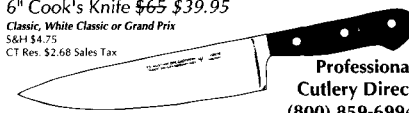
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Fallows knows this, and should not be too surprised by the treatment he has received. It is a good sign that he scored. But readers should ignore the reviews and read the book, because it is also an excellent guide to the struggles that will almost certainly dominate our politics within a very short period of time. China and Japan are the only two foreign countries today that could threaten the national security of the United States if we had relations of conflict with them. One is the world's biggest society, the other among the world's richest in terms of per capita income. Just as the century changes, the world is witnessing a basic change in Asia from enrichment to empowerment. The nineteenth century was the time of the victimization of Asia. In China it took the form of imperialist enclaves, of which Hong Kong is one of the last remaining. In the rest of Asia (except for the buffer state of Thailand) it took the form of European, American, and Japanese colonialism. The twentieth century has been the time of revolt against this imperialism, including the Chinese Revolution (the biggest revolution among all the cases), revolts by subject peoples during interimperialist wars, and wars of national liberation in Indonesia, Indochina, and Malaya.

These wars are now over, and only a few embers from them still smolder. Rich Americans are starting to take luxury cruises to Vietnam, disembarking at Danang for a quickie bus tour to Hue. Vestiges of the old victimization and its consequences still linger in the soon-to-change status of Hong Kong, the not-soon-to-change status of Taiwan, the partition of Korea, and the influence of the U.S. Seventh Fleet. The enrichment of Asia occurred during the Cold War and depended on one degree or another on the opportunities made available by the conditions that prevailed. Today enrichment is a self-sustaining process, still benefiting from the openness of the American market but no longer dependent upon it. During 1993, using Japan's definitions and accounting methods, Japan had a trade surplus of \$53.6 billion with the rest of Asia, as against a surplus of \$50.2 billion with the United States. The shift from mere enrichment to empowerment is clearly on the agenda. It has started to show up in Asians' growing irritation with the American tendency to deliver sermons on human rights, free trade, mul-

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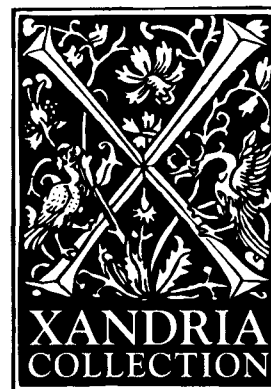
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THE empowerment of Asia is going to come as a shock to a lot of Americans. They have not been "looking at the sun," as Jim Fallows puts it, but have been following the advice of the *Los Angeles Times*: "America, take off your sunglasses." Nor are our universities doing a good job of preparing people for the Pacific century. Professors these days are totally devoted to what they call theory—nineteenth-century English economic theory, rational-choice theory, French literary theory, and gender theory—to the exclusion of all forms of empiricism, language study, and awareness of differences in national character. In contrast to the days when universities provided expertise on Russia and China, today people seeking such knowledge must turn to think tanks. This is one of the reasons I retired early from the University of California and am involved in creating a research institute devoted to policy issues in the Asia-Pacific region. The government itself has access to less genuine expertise on Asia—that is, the expertise of people who have studied and lived in Asia and who read and speak an Asian language—than it has had at any other time since the 1940s.

When Americans wake up to the shift in the balance of power to Asia, they are likely to feel betrayed and angry. They will wonder why they were not warned. Jim Fallows is one of the few issuing a warning. He is also responding seriously to Japan's emergence as a major economic power—one whose economy is three fifths the size of the United States, the first economy in history to produce a \$100 billion trade surplus, and the economic equivalent of two Germanys in the Pacific. History teaches us that inattention, drift, and appeasement are not the proper ways to deal with such a nation. In the past comparable policies have led to war. Copying Japan is also not the way to go, and Fallows explicitly warns against it. We must use our own national heritage and resources to match Japan, not copy it, just as we matched but did not copy the former USSR. We would be



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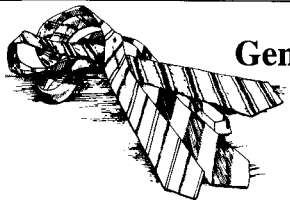
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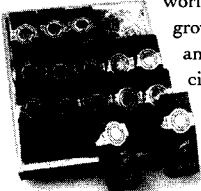
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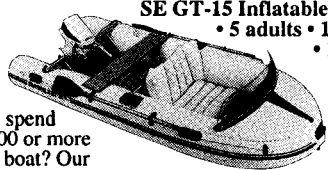


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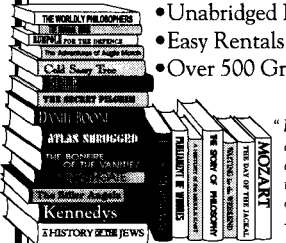
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crazy to imitate, for example, Japan's persistent waste of female talent because of the influence of its rigid gender-based division of labor. We are decades ahead of Japan in terms of integrating women and minorities into all levels of our labor force. This is not a time for complacency, however. Shortly the widespread American belief that Japan is finished will be exposed as an idiotic conceit. We will then have the choice of either matching Japan or adjusting to its ascendancy.

Fallows and the few others like him are not anti-Japanese. They may well be the only true friends Japan has in the West. The issue for the next century, as it has been for the one now ending, is how, short of war, to adjust to the rise of new sources of power and the decline of old ones. Complex factual knowledge of the sort contained in *Looking at the Sun* is the first requirement. ☼

The Architect Who Couldn't Draw

by Robert Campbell

PHILIP JOHNSON:
Life and Work

by Franz Schulze.
Knopf, 465 pages, \$30.00.

PHILIP Johnson, aged eighty-eight, the most famous living American architect, recently emerged unbruised from the financial collapse of his former firm. It was the latest in a lifelong series of implausible comebacks.

Johnson may or may not be a great designer, but he's an undoubted master of cultural politics. Since the 1930s he has been a major force as architect, critic, curator, teacher, historian, and patron. For decades he virtually dictated the architectural taste of the Museum of Modern Art. He did as much as anyone to bring the modern movement to America, and then, fifty years later, abandoned that move-

ment with his design of the Chippendale-topped AT&T tower in New York, which put him on the cover of *Time* magazine as the guru of postmodernism. As controversial as ever, he is now offering a scheme for a family of high-rise towers in Times Square—a modish family, which seems to adopt a new fashion in architectural clothes every time its picture appears in public.

Johnson's life story is a melodrama, and Franz Schulze, who previously wrote a biography of the German modernist Mies van der Rohe, tells it ably. Schulze is fair in his judgments and diligent in his research. He isn't a lively critic of Johnson's architecture, but there's no shortage of those. His only real fault is a tone-deaf flattening of language, which fails to capture the grace and wit of his subject. (For example: "History provided the best salve for the contextual sores the 1960s were beginning to blame on the bad medicine of modernism.")

Johnson, a rich kid from Cleveland, majored in philosophy at Harvard, where he abandoned an early love for the moral absolutism of Plato and turned instead to Nietzsche. The gods were gone, leaving a void filled only by the sacredness of art. "We have art that we may not perish from the truth"—it's a maxim Johnson still quotes. At Harvard he suffered manic-depressive cycles and two breakdowns, and took seven years to graduate. Yet within months, at the age of twenty-four, despite never having formally studied the subject, he was, through his friendship with Alfred Barr, put in charge of the architecture program at the new Museum of Modern Art in New York. There, in 1932, with the historian Henry-Russell Hitchcock, he staged a fateful exhibition, "The International Style," which introduced European modernism to America.

Two years after that triumph the mercurial Johnson quit MOMA and architecture to spend the rest of the decade thrashing haplessly in fringe-group politics. In 1932 he had attended a Nazi rally in Potsdam, where he was enthralled by Hitler and, as he told Schulze, "all those blond boys in black leather." He did volunteer work for Huey Long, who ignored him, ran an abortive campaign for the Ohio legislature, and championed the anti-Semitic radio priest Father Charles Coughlin. Schulze chooses not to quote the most repugnant of Johnson's writings from this

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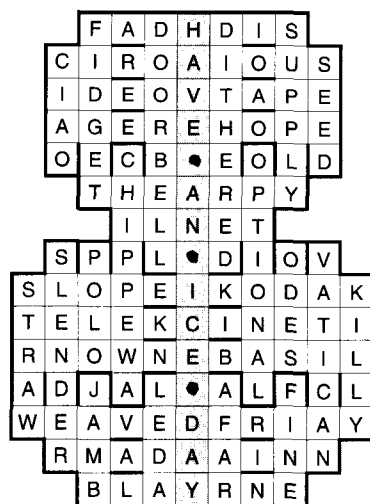
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period, but what he does print is damning enough. For example:

Reduced to plain terms, Hitler's "racism" is a perfectly simple though far-reaching idea. It is the myth of "we, the best," which we find, more or less fully developed, in all vigorous cultures.

When Hitler invaded Poland, in September of 1939, Johnson camp-followed the panzers as a correspondent for Coughlin's magazine, *Social Justice*. By chance the journalist William Shirer shared a Polish hotel room with the future architect. Shirer later wrote, in his best seller *Berlin Diary*, "None of us can stand the fellow and suspect he is spying on us for the Nazis"—words that haunted Johnson's career for years to come.

As Schulze points out, Johnson was not the only intellectual of his time who read Nietzsche, identified himself as an *Übermensch*, and dreaded the rise of mass culture. Brilliant but quickly bored, intellectually rudderless, he has been a pushover all his life for any new idea. It's a trait that keeps him safely in the vanguard of architectural fashion.

WHAT makes this biography fascinating is that Johnson's life is such a helpful gloss on his work. He once told me, "I thought the fascist dictators were going to build in a grander way than the democracies, by analogy to the papacy and the monarchies." Eventually he found clients with an appetite for ostentation in the American business world. His life thus offers an insight into the authoritarian, tomblike pomp—meant, perhaps, as mockery—of such a work as the AT&T tower.

When America entered the war, Johnson swerved again. He enrolled as a student at the Harvard architecture school, which was then headed by such former Bauhaus modernists as Walter Gropius and Marcel Breuer. Although he never really learned to draw, he graduated at the top of his class in 1943.

That was the year, as it happens, of Ayn Rand's novel *The Fountainhead*, and it's possible to view Johnson—ever the cultural tuning fork—as the double image of Rand's hero and villain: as the Nietzschean Gary Cooper figure, self-willed, arrogant, contemptuous, for whom art comes before all else; but also as the well-

tailored, crowd-pleasing, handshaking society architect, the favorite of wealthy hostesses.

After the war Johnson regained his old friendships and patrons and his old job as the head of the architecture department at MOMA, and he began a career as a practicing architect which went into orbit almost at once. His vehicle, made possible by his private wealth, was a house he designed for himself in New Canaan, Connecticut, with walls made entirely of glass: the Glass House, a modern classic. It derived from the ideas of Mies, but it was a distinguished work nonetheless, and it proved to be only the first in a series of one- and two-room pavilions Johnson would build, and is still building, for himself on his ever-growing property. After Johnson's death his estate is to be opened to the public by the National Trust for Historic Preservation.

Johnson's practice grew from houses to museums to office buildings. By the 1980s his name was so big that an American city that lacked a tower by Johnson and his partner, John Burgee, felt that its skyline was incomplete. Every corporate client wanted something that looked a little different, a sort of architectural logo. Johnson responded by milking history

for a zany variety of styles. His buildings seemed to be random spinoffs from whatever image happened to be floating through his mind or library at the moment of design. But he is never less than witty, and at times all through his career he has been superb. One thinks, among other things, of the half-transparent mirror of the Glass House in an autumn landscape; the Zen-like calm of the sculpture garden at MOMA (now marred by alterations); the glittering presence of the Transco Tower, in Houston; the matchless elegance of the Museum for Pre-Columbian Art at Dumbarton Oaks, in Washington, D.C.; the urbanity of the IDS Center, in Minneapolis; and the astonishing interior of the Crystal Cathedral, in California.

Johnson designed the cathedral for the egregious media hound Robert Schuller; it was completed in 1980. Speaking to Schuller's congregation in 1990, at the dedication of a bell tower for the cathedral, Johnson, a lifelong atheist, his voice breaking, said he couldn't have done it without help from above.

One caveat: Prospective buyers should not confuse this excellent book with one called *Philip Johnson: The Architect in His Own Words*, a handsome but feather-weight hagiography. ☼

BRIEF REVIEWS



City of Djinns: A Year in Delhi

by William Dalrymple.
HarperCollins, 352 pages,
\$23.00.

Because Mr. Dalrymple opens his year in Delhi with his rich and stingy landlady and her dotty husband, the reader may anticipate a pukka sahib report on quaint natives. The fear is groundless. Mr. Dalrymple is a sympathetic observer of Indian life and a hardworking student of the history of Delhi. Beginning with Mrs.

Puri, the landlady, a Sikh driven penniless out of Lahore at the Partition of 1947, the author works his way back through the Raj, the Mughal Emperors, and the *Mahabharata*, arriving at archaeological digs into the remote past. Along the way he finds improper Englishmen, murderous intrigues, crumbling palaces, holy men, descendants of Genghis Khan, eunuchs, doctors practicing medicine in classical Greek style, connections with the Gilgamesh epic, and partridge fights. Partridge fighting is an old diversion of which Delhi is still a famous center. Now-

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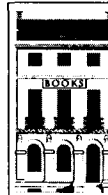
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What are the facts?

A Rogue Country and a Rogue President. Syria is an outlaw country and is classified as a "terrorist state" by the United States. Terror is the most pervasive aspect of the Syrian regime. Much of that terror is conducted through "clients", such as the terrorist bands of the PLO, the infamous Hamas, and the Iran-sponsored Hizbullah, to all of which Syria extends protection and warm hospitality. Syria's most ruthless terror, however, is reserved for its internal opposition. In 1982, President Assad put down a rebellion in the town of Hama, in which he killed 20,000 people.

More cunning even than his Iraqi counterpart, President Saddam Hussein, he

shares with him utter ruthlessness. disregard of human life and above all an abiding hatred of the West, which

means primarily the "big-devil", the United States and the "little devil", Israel, the perceived outpost of Western culture, of Western democratic concepts, and of "American imperialism" in the Middle East.

Main sources of Syria's revenue are the large-scale and officially conducted narcotics trade, and massive counterfeiting of American currency. Few doubt that Mr. Assad personally authorized the suicide attack on the Marine barracks in Beirut in which 241 Americans lost their lives and in the blowing up of Pan Am

"For Israel to survive, the Golan must stay in Israeli hands. The Golan is the price the Syrians must pay for their aggressions. All things considered, it's a small price."

Flight #103, in which 270 people died. Even today, Assad gives hospitality to surviving thugs of the Nazi regime, outstanding among them Alois Bruner, Eichman's deputy and main slaughterer. The terror in Israeli cities could not possibly occur if President Assad were to forbid it.

The Obsession with the Golan. Since the founding of Israel in 1948, Syria has attacked it three times, by surprise and without provocation. In the Six-Day War of 1967, Syria suffered a decisive defeat and lost the Golan Heights, a Queens-sized plateau. Israel has been in possession ever since. The Golan is of vital strategic importance to Israel because it makes a Syrian attack against Israel virtually impossible. On the Golan, Israel is protected by sophisticated electronic surveillance

and warning systems and by one of the deepest and most formidable obstacle systems in the world. The

Golan is desolate and serves no real purpose, except as a defense post for Israel or as an attack-launching pad for Syria. Syria is obsessed with the Golan and has stated over and over again that it will not make peace with Israel unless and until the Golan is handed back in its entirety. But if such an exchange—the Golan Heights for peace—should come about, Israel's continued existence or destruction would depend on the good will of the Syrian dictator or his successor. It's a risk that Israel should not be asked to assume.

The conflict between Syria and other Arabs with Israel is not about land—it is about Israel's very existence. No other country in the world would be expected to yield indispensable strategic ground to those who are sworn to destroy it. One may ask why Israeli leaders, among them experienced generals, would wish to consider such a gamble. But leaders do make fatal errors in judgment. We only need to remember British Prime Minister Neville Chamberlain, who in his quest for peace agreed to the dismemberment of Czechoslovakia and thus brought about the Second World War. Considering that Syria is a rogue country with a rogue president, Israel should not make its survival dependent on Syria's "goodwill". Yes, there must be concessions. But, for Israel to survive, the Golan must stay in Israeli hands. The Golan is the price the Syrians must pay for their aggressions. All things considered, it's a small price.

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adays these "bird challenges" are held in a Muslim graveyard, where Mr. Dalrymple observed one. He describes the proceedings with sharp details of the betting, the jostling, and the birds' shrieks and leaps and spur-slashings. The contest was exciting, until it was interrupted by the unforeseen arrival of a funeral. The defeated cock, kissed and cuddled by its owner, was expected to survive. There is, perhaps, a faint parallel between that partridge and Delhi. The city has been destroyed and rebuilt throughout its history. Its present condition appears to approximate convalescence—a time of transition between the disruption caused by the Partition of India and a new type of society created by the resulting influx of Hindu refugees, among whom are the Puris and Mr. Balvinder Singh, of International Backside Taxis, without whom the author would have seen less and done it less amusingly.

Gustav Klimt: From Drawing to Painting

by Christian M. Nebehay.
Abrams, 288 pages, \$65.00.

Mr. Nebehay inherited from his father a connection with the Viennese art world and knew Klimt in the last year of his life. He has had access to background material and unpublished sketches and has used these resources adroitly to show the artist's working methods and the extent of his influence, and also the kind of patrons he attracted and the conservatives whom he alarmed. The illustrations are generous and so are the quotations from Klimt, his associates, his sometimes exasperated friends, and his critics. (Turn-of-the-century Viennese critics were both savage and witty.) This is a splendid book for any admirer of Klimt and likely to make an admirer of anyone unfamiliar with that artist's glittering, idiosyncratic, subtly disturbing creations.

Hardy

by Martin Seymour-Smith.
St. Martin's, 896 pages,
\$35.00.

Previous biographers have represented the novelist Thomas Hardy as a misogynist, a misanthrope, a social misfit, and a moping neurotic. He has even been credited with an illegitimate son. Mr.

Seymour-Smith disagrees with all such interpretations. The difficulty with his own life of Hardy is that denunciation of those previous biographers frequently obscures his view of Hardy as a man who combined acute social sensibility and rationally controlled pessimism with canny professional action. There is a consistent interpretation of Hardy in this fat volume, but a reader must exercise patience and persistence to find it.

Toulouse-Lautrec

by Julia Frey.

Viking, 680 pages, \$34.95.

Ms. Frey has had access to family papers that were either overlooked or concealed until recently, and these documents have enabled her to provide information on areas of the painter's life in which gossip and guess have previously flourished. Henri de Toulouse-Lautrec's story remains basically what it has always been—an example of great accomplishment against heavy odds of pain and physical disability—but added detail makes it even more impressive, and Ms. Frey's attention to relatives, friends, fellow artists, and dealers creates a solid worldly setting. There are numerous black-and-white illustrations and fifty color plates, which, although small in scale, serve the reference purposes for which they are intended. Well-written, well-constructed, and intelligently sympathetic, this is an excellent biography of an extraordinary artist.

Good Bones and Simple Murders

by Margaret Atwood.

Doubleday/Nan A. Talese, 164 pages,
\$20.00.

Ms. Atwood's collected oddities and fragments are individually inventive and satirical. Gertrude of Denmark gives her version of the family scandal. A disgruntled narrator recalls a previous and more agreeable life as a bat. Correct feminist terminology destroys a classic fairy tale. A visitor to an alien planet explains her macabre motives. The quality that holds the disparate items together is contempt—contempt for society in general and men in particular. The pieces read best in isolation, for taken at one sitting they arouse pity for the author's victims—men in particular.

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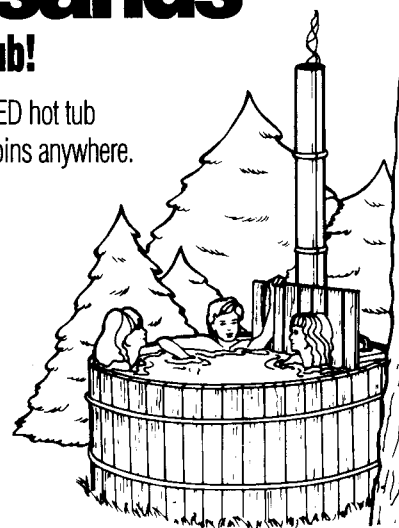
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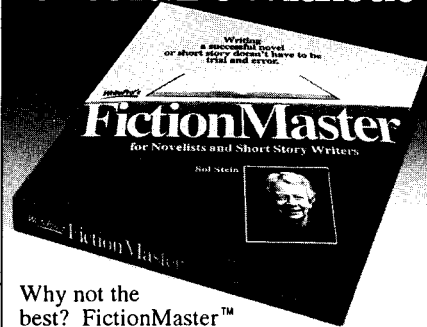


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Hunters & Gatherers

by Geoff Nicholson.

Overlook, 215 pages,
\$21.95.

The protagonist and part-time narrator of this novel is an unsuccessful writer who has wangled an advance for a book about eccentric collectors. He finds several of those, one of whom collects him. As a story about people, the tale is not to be taken seriously. As a reflection on the amount of disorganized trivia, both material and factual, that encumbers modern society, it is intentionally and effectively disconcerting.

Great Art Treasures of the Hermitage Museum, St. Petersburg

Abrams/Booth-Clibborn, 1,581 pages,
\$195.00.

Although the traditional birth date of the Hermitage is 1764, when Catherine II bought a large number of paintings, royal collecting had already begun with Peter the Great's enthusiasm for Dutch and Flemish art. The imperial habit spread and so did the museum, which now occupies an impressive stretch of riverfront and contains about three million items, some of which are presented in this impressive publication: a two-volume, boxed, twenty-pound monument. The photographs of everything from Stone Age figurines to twentieth-century paintings are accompanied by texts from museum experts. These texts are flatly utilitarian in style but suitably informative. The objects displayed are magnificent and more than justify the claim of the director, Mikhail Piotrovsky, that his museum is "one of the world's greatest."

The Living & the Dead:

The Rise and Fall of the Cult of World War II in Russia

by Nina Tumarkin.

BasicBooks, 254 pages,
\$25.00.

Nina Tumarkin's *Atlantic* report on this subject, "The Great Patriotic War as Myth and Memory," appeared in the June, 1991, issue.

—by Phoebe-Lou Adams

ANNOUNCING THE NEW ANNUAL PUZZLER CONTEST

The Atlantic Monthly Puzzler contest—heretofore a monthly affair—is now a once-a-year event, with a greater reward for the winner. In the April issue Emily Cox and Henry Rathvon will introduce this year's contest puzzle—designed to challenge even the fans who have solved the pair's past offerings. The prize is a \$150 gift certificate to Zingerman's, the gourmet-food mail-order house frequently mentioned in Corby Kummer's food columns as a source for high-quality ingredients. So whet your appetite along with your pencil.

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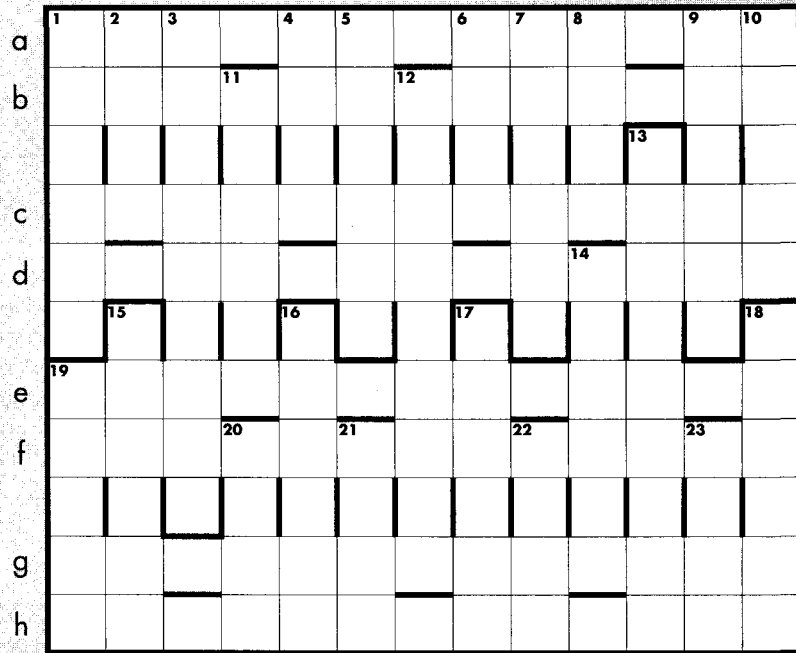


THE PUZZLER

by Emily Cox and Henry Rathvon

Janus-Faced

Like the two-faced Roman god Janus, solvers of this puzzle will need to look both ways. Each row contains up to three words reading forward and up to three other words reading backward, using all 13 squares in each case. Word breaks are not marked and do not necessarily coincide for the two directions. Each row's words, forward and backward, have their *definitions only* strung together in random order in lieu of normal cryptic clues. Down entries are clued normally. There are ten proper nouns among the 38 forward and backward entries and three among the Downs; an alternate spelling appears in row **b**.



See page 110 for Puzzler contest details. The solution to last month's Puzzler appears on page 106.

Across

- a. Conservative party members corrupt humor headliner
- b. Sweet girl Helen's mother, native of Yemen city in the north, inspiring spirit
- c. Select European part of a church square made of clay pipe
- d. Solitary U.S. President goes back over problem resulting from stress
- e. Explosive speaker can love tender, starchy Polynesian food
- f. Box vessel of 1492 mint wine from Greece
- g. Nosy Parker called attention to utensils
- h. Ready to publish best current commercials, "Bug Bites"

Down

- 1. Marble—plain or garish (6)
- 2. Theodore's clutching bouquet (4)
- 3. Train goes into food truck (9)
- 4. Pop singer's band engulfed in deafening noise (4)
- 5. Weave clean new web in the middle (6)
- 6. Chances with Ohio dentist (4)
- 7. Chalice holding a Maine rose (6) (two words)
- 8. Split monthly bill? (4)
- 9. Auditor's informed what Quasimodo did (6)
- 10. Mischievous ne'er-do-well smothers derisive look (5)
- 11. Road in Laker territory is for Celtic VIPs (6)

- 12. Anticipating version of next tape around the fourth of March (9)
- 13. Candiotti dissembled, speaking for the record? (9)
- 14. Sends out cheer (6) (two words)
- 15. Paid off kid adopted by foundation (6)
- 16. Announced places in churches for rogues (6)
- 17. Sterne confused Hemingway (6)
- 18. Tee in back of golf course cries for woods (6)
- 19. Poem unusually deep about love (5)
- 20. Judge rejected T. S. Eliot heartlessly (4)
- 21. Fish and beef (4)
- 22. One British pol's naughty children (4)
- 23. Ten horses around a mountain (4)

Note: The instructions above are for this month's puzzle only. It is assumed that you know how to decipher clues. For a complete introduction to clue-solving, send an addressed, stamped long envelope to The Atlantic Puzzler, 745 Boylston Street, Boston, Mass. 02116.

WORD COURT

by Barbara Wallraff

I work for an attorney and proof-read his documents. I always cross out phrases in which he uses where, an adverb, to modify a noun—for example, “a case where” or “a situation where.” He always ignores my notes and leaves the script as is. I say it should be “a case in which,” and so forth. What do you say?

Carol Botteicher
Johnstown, Pa.



The court finds for you. You cannot, however, object to your boss’s constructions on strictly grammatical

grounds. *Where* isn’t only an adverb; it can also be a subordinating conjunction, one of whose jobs it is to attach certain other parts of a sentence to a noun.

What you *can* say, though, is that it is considered a stylistic flaw to use *where* where the meaning has little or nothing to do with places or space: *The restaurant where we met for dinner*—fine. *A case where I was at a loss*—no, not really.

Various language experts use words like “immature style” and “amateurish” when they describe this flaw. Needless to say, don’t tell your boss that. That one is right is unpleasant enough for others when one is tactful about it.

For several years now I have noticed increasing reference to people as inanimate objects, as in “Are you the one that borrowed my dictionary?” Is this more than a passing trend? What do you make of it?

Jeff Sloan
Pueblo, Colo.

I’m as touchy as anyone, I like to think, when it comes to issues of dehumanization. For example,

I wince when I hear someone say to a supermarket cashier who seems idle, “Are you open?” What’s wrong with “May I check out here?” or “Is your register open?”



I hope you will trust me, therefore, when I tell you that the word *that* has a long history of referring to people as well as things. This usage may in some contexts sound a bit crude, but it is not ungrammatical, and it can sometimes offer a writer a graceful way out, as in “Did she say it was a man or a book *that* she curled up with last night?”

My son’s English teacher gives him writing samples that use *like* as a conjunction. Have I missed something? Is it now acceptable to use *like* in place of *as*? Or do we no longer follow rules of grammar like we used to?

Cathie Lowmiller
Chandler, Ariz.

People who remember the flap over a cigarette that “tastes good *like* a cigarette should,” some forty years ago, can consider themselves up to date—at least with respect to the grammar of the slogan. The rule about *like* never did quite ban using it as a conjunction but only forbade using it to introduce a clause—that is, a group of words containing a verb, such as “a cigarette should.”

(It may be used as a conjunction if one leaves unexpressed the verb that would come after it: “The Surgeon General responded *like* a firehorse to a bell.”)

This rule still holds in standard English, but informal English almost requires one to break it—a distinction those sly ad copywriters surely kept

in mind. Alternatives that are acceptable at both levels of language do exist: *As if* sometimes works (“It sounded almost *as if* they were telling the truth”). And where *as*

if won’t do, *the way* usually will (“It comes in a pack with a warning label, *the way* a cigarette should”).

I have been waging a one-man battle for months at work. I contend that the possessive form of a singular noun is created by adding an apostrophe and *s*, even if the noun already ends in *s*. For example, the possessive of Charles is Charles’s.

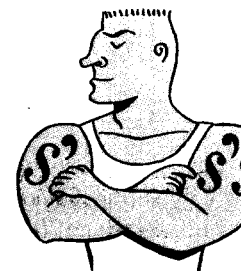
My co-workers all believe that you add only the apostrophe to any word ending in *s*, so they insist the proper form is Charles’.

Who is right?

Tom Corell
Porter Ranch,
Calif.

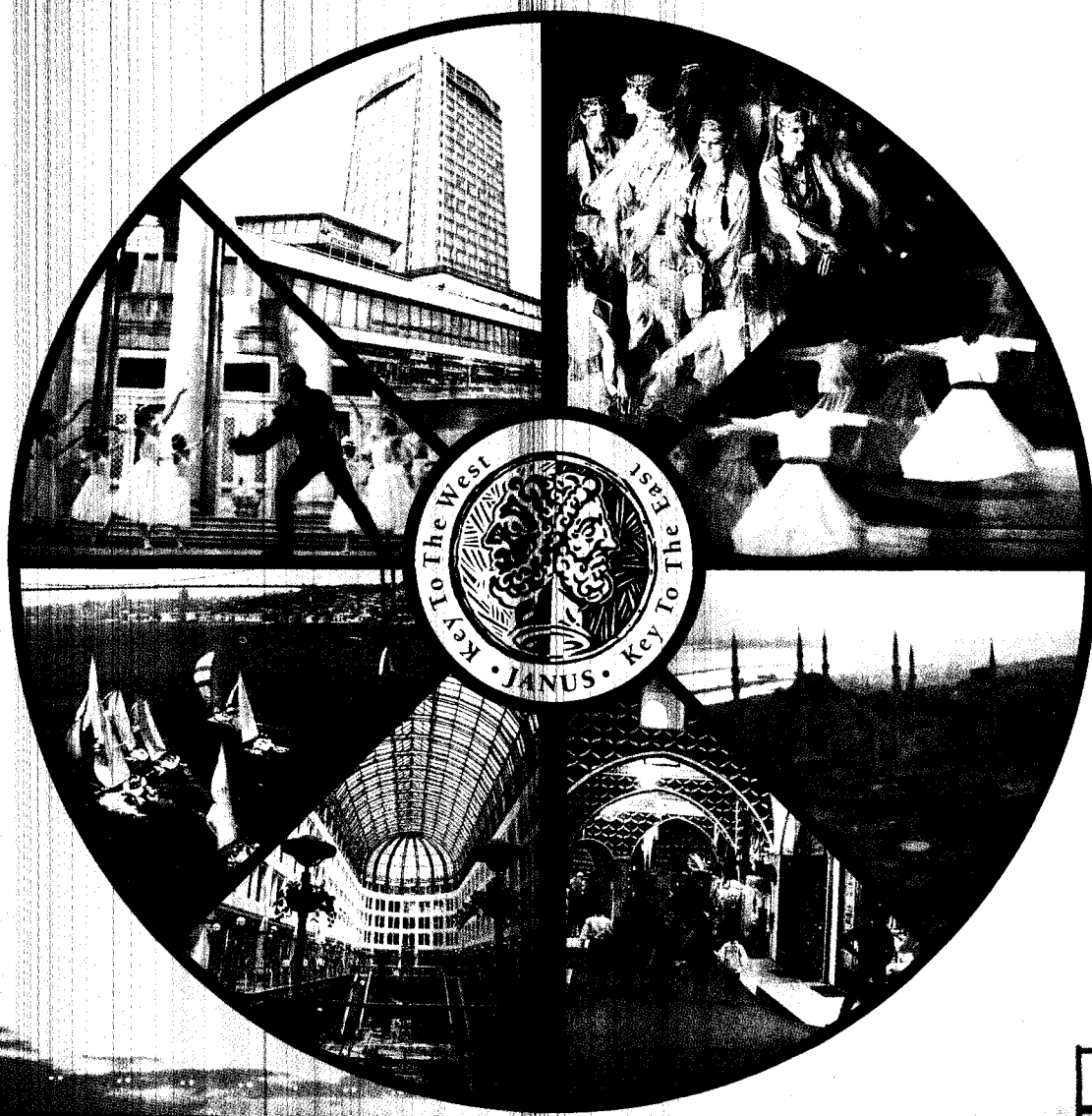
Your rule is certainly the usual one, though language authorities recommend some exceptions to it. Constructions in which it would be difficult to pronounce an additional sibilant (an *s*, *sh*, *x*, *z*, or *zh* sound) are a common kind of exception. Most authorities would add only an apostrophe to a proper name that ends in two sibilants, such as *Jesus* or *Texas*. By a similar rationale, *for conscience’ sake* and *for goodness’ sake* are also preferred.

But the exceptions are fine points. Be grateful that your co-workers don’t think the possessive of *Charles* is *Charle’s*.



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